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# REPLACEMENT MIGRATION: IS IT A SOLUTION FOR RUSSIA? *

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## A. THE ANALYTICAL POPULATION PROJECTION FOR RUSSIA, 2000 – 2050: MAIN ASSUMPTIONS

Table 1 summarizes the main assumptions and certain results of the population projection for Russia for the years 2000 to 2050. The purpose of this projection was not to predict, with a maximum possible confidence, how the country's population size and age composition will actually vary in the nearest 50 years, but rather to examine the paths of such changes in accordance with certain, more or less feasible, scenarios of demographic developments.

### *1. Three groups of scenarios*

The 12 proposed scenarios are divided into three groups:

- Group I: Scenarios with a zero net migration. This group of scenarios permits to estimate the possibilities of the population increase and potential changes in its age composition entirely as a result of an interaction between fertility and mortality. The Group I scenarios show that, under any somewhat realistic assumptions with regard to these two processes, a natural increase in the population of Russia will be negative during the nearest 50 years, while the population size will steadily decrease.
- Group II: Scenarios with a constant population size across the whole 2000 – 2050 period. These show which should be an annual positive net migration to Russia in order to compensate the consequences of a negative natural increase and to assure a constant population size up to 2050.
- Group III: Scenarios with a rising population size. Scenarios of this group permit to estimate, which should be an annual positive net migration to Russia in order to assure an annual half-a-percent increase in the population size during the nearest 50 years.

In all scenarios, the fertility and mortality indicators are considered as independent variables, primarily determining the population dynamics. Therefore the choice of employed fertility and mortality assumptions needs to be substantiated from the very beginning. As to migration (wherever it presents, i.e. in the second and third groups' scenarios), it is a possible exogenous response to a course of events predetermined by an endogenous demographic development, and its value should be determined as a result of projection calculations.

### *2. Fertility assumptions*

The fertility rate in Russia was decreasing during the whole 20th century. In the mid-60s, it plummeted, for the first time, below the replacement level and continued to decrease. In the 90s, this decrease accelerated. By the end of century, the total fertility rate in Russia, like in some other European countries, dropped below the 1.3 mark. The reasons for such a deep drop have not been completely understood; however it is apparently a part of a global process that is being driven by its own inherent forces. One cannot therefore expect Russia to find itself outside this trend, common for countries with roughly the same level of economic and social development.

It is unlikely that all these countries would experience, during the next 50 years, a turnaround towards the rise of fertility rate; rather the opposite may be expected: the continuation of the present low fertility rate up to 2050. Moreover, its further decrease is not improbable. However, in view of the insufficient current knowledge of the fertility dynamics mechanisms, its future rise cannot be entirely excluded.

The present projection assumes the total fertility rates of 1.3 and 2.0 as the upper and lower bounds, correspondingly, of the probable fertility changes. The first value will remain unchanged over the whole period up to 2050, while the second one will gradually rise from 1.3 in 2000 to 2.0 in 2050.

### *3. Mortality assumptions*

While the fertility dynamics in Russia is quite similar to that in most industrial countries, the mortality dynamics is significantly different, because a steady mortality decrease, typical for such countries, ceased in Russia a few decades ago. However, the global experience clearly shows that such a decrease is possible in principle, so a decrease of mortality in Russia before 2050 seems much more likely than a rise of fertility.

The current Russia's lagging behind most Western countries may be explained primarily by an excessive, compared to the West, premature mortality due to external causes and circulatory diseases. In 1995, these two classes of causes of death were responsible for 85% of the excessive mortality in the age groups below 70 years. Of them, external causes were responsible for 46% of excessive deaths of men and for 25% of deaths of women (Visnevsky and Shkolnikov, 1997, pp. 80-81). The Western experience suggests that a successful struggle against mortality owing to such causes is much more directly and obviously (as compared to the fertility trends) connected to a general socioeconomic climate. The changes in this climate, that are being prepared by the current reforms, will result, sooner or later, in a mortality trend turnabout in Russia, after which it will start to gradually decrease down to the level typical of the Western countries.

As in the case of fertility assumptions, the projection determines the lower and upper bounds of the life expectancy probable changes. The first parameter is equal to $e_0$ = 59.9 years for men and $e_0$ = 72.5 years for women, recorded at the end of century and remaining constant over the whole projection period. The second parameter is equal to e0 = 77.0 years for men and $e_0$ = 83.0 years for women by 2050 (while gradually reaching these values over the whole period).

Even if the actual fertility and mortality dynamics will differ from those assumed in the current projection, the assumptions made therein allow for covering a very wide range of more or less probable prognostic scenarios, while the computational results offer a clear estimation of trends and extents of the population size and composition under various assumptions as regards the future fertility and mortality developments.

## B. The Analytical Population Projection for Russia, 2000 – 2050: Main Results

### *1.Changes in the population size*

The population size of Russia in 2015 and 2050 by projection scenario is presented in Table 1, Section F, and in Fig. 1.

#### *a. Scenarios with a zero net migration*

Even a simultaneous and quite significant rise of both fertility and life expectancy will be unable to break the downward trend in the population size and its gradual approaching the 1950 level. It should be noted that, by 1950, Russia still did not restore its population size of 110 million that had been recorded in 1940.

In the worst case under accepted assumptions, i.e. at the constant current low fertility and high mortality (the scenario IA), 86.5 million is all that can be expected as a population size in Russia by 2050.

A fertility increase of up to 2 children per woman by 2050, at an unchanged mortality (the scenario IC), would allow this size to rise by about 8 million, up to 94.5 million; however such a rise has been noted as unlikely.

The effect of mortality decrease seems more probable and in edition it could be much more significant. Russia is currently suffering enormous demographic losses due to a high mortality. Should its age-specific mortality rates in the 80s and 90s be the same as in the Western countries, the annual number of deaths would be 500-700 hundred thousands less than it really was, which could notably change the current balance of births and deaths and defer the emergence of a negative natural increase.

Also in the future, the mere ability of avoiding the population losses, already attained in many countries, would slow down the decrease in the Russia's population size. At a constant fertility rate, a decreased mortality rate would result in 17 million additional Russian citizens, thus bringing the population of Russia to 103.3 million by 2050 (the scenario IB).

However, it would be impossible to completely avoid a decrease in the population size, even at the most favorable (within the framework of the assumptions made) fertility and mortality evolution. In the best case, the population of Russia would amount, by 2050, to about 112 million (the scenario ID).

*b. Scenarios with a non-zero net migration*

An apparent inability to maintain even a constant population size in Russia solely due to the fertility and mortality interaction compels one to resort to the third main factor of the population dynamics, i.e. migration.

Under the above mentioned assumptions, in order to maintain an unchanged population size over 50 years, the total net migration to Russia should range from 35 million (about 690 thousand per year), in the case of the most favorable fertility and mortality evolution, to 69 million (about 1.4 million per year), in the case of the least favorable fertility and mortality evolution.

For the population size of Russia to increase by 0.5% annually between 2000 and 2050 (in the 70s and 80s, the population of Russia increased by 0.6 - 0.75% per year), the total net migration to Russia should range, according to various fertility and mortality scenarios, from 76 to 118 million (1.5 to 2.4 million per year) (see Table 1, Sections D and E).

*2. Changes in the age composition*

The main trend in the age composition changes, according to all scenarios of the projection, is the aging of the population. It should be noted that the series D, scenarios that are the most favorable with regard to the population size increase, are at the same time the least favorable with regard to the aging.

*a. Scenarios with a zero net migration*

On the assumption that the low fertility and high mortality remain unchanged in the course of the nearest 50 years (the scenario IA), the proportion of the elderly people (those over 65) in the Russia's population would exceed 26% by 2050, while it was below 6% as recently as 1959, and 12.5% in 1999. At the same time, the proportion of children under the age of 15 would drop to 12% (compared to 29% in 1959 and 19% in 1999).

Should the scenarios materialize that assume the fertility rise and mortality decrease, two conflicting trends would collide: the fertility rise would, to a certain degree, counterbalance the aging, while the mortality decrease would corroborate it. Therefore, the scenario IC (a rising fertility at an unchanged mortality) turns out to be the "youngest" one, while the scenario IB (a decreasing mortality at an unchanged low fertility) - the "oldest" one.

Such changes in the age composition also determine the dynamics of the age dependancy ratio.

The ratio of the elderly to the adult population will significantly rise in any event. While it was just 9 elderly persons per 100 adults (aged 15 to 65) in 1959 and 18 per hundred in 1999, it will rise, by 2050, up to 41 to 50 elderly persons per 100 adults, according to the scenario used.

However, the rise of the *total* dependancy ratio (due to both the elderly and children) will be much less impressive. Owing to the peculiarities of the Russian

population pyramid, it is not unlikely that this ratio now is the lowest during the last 50 years, so that its future increase is unavoidable in any case. Yet even by 2035 it will not exceed (and according to most scenarios will even stay below) that in 1975 when it was far from extraordinary.

Only after 2035, and then not simultaneously under all scenarios, the total dependency ratio will exceed 50 per 100 adults, increasing gradually towards the year 2050. However even in 2050 it will nor achieve, according to three of the four scenarios of the first group, the level of 1939, when the population of Russia was very young and rated about 40 children under 15 per 100 adults. Only the scenario ID, which is the best from the viewpoint of population size, augurs an increase in the total dependency ratio of up to 75 per 100 adults; however the likelihood of such a scenario is not high.

*b. Scenarios with a non-zero net migration*

The age composition of migrants is usually notably different from that of the population, resulting therefore in either washing-out - in the case of emigration - or washing-up (expansion) - in the case of immigration - of certain age groups.

As a rule, the migration age composition is shifted towards the younger ages. In the 60s to 80s, three quarters of all Russian migrants were younger than 30, while the migration had almost ceased upon the achievement of that age. By the end of 90s, the migration flows has "aged", and migrants in the age group below 30 amount to less than 60% of the total flow, the composition of which has shifted towards the mature and more elder ages (Zayonchkovskaya, 1999, pp. 122-124). However such a change in the age composition of the migration flows is, most likely, of a temporary nature. If Russia will actually absorb, during the 2000 to 2050 period, significant migration flows, they will originate in the countries with a young age composition and hence will also be quite young and contain many very young people, or those slightly older but married and having small children. This will definitely cause a rejuvenating effect upon the age composition of the whole population. The question is, to which extent?

The calculations show that, while the migration is incapable of radically changing the main trends in the age composition, its impact still may be quite significant and, at the same time, contradictory. Although in most cases it contributes to the reduction of the dependency ratio (either that due to the elderly or the total one), it also produces an unexpected effect in the case of the series B scenarios (a constant low fertility and a decreasing mortality). The matter is: the migration increase results initially in the reduction of dependency ratio, while later, as the migration flow rises, this ratio also increases (see Table 1, Sections G and H).

## C. CONSEQUENCES

### *1. Consequences of population decrease*

The population decrease is one of the serious challenges facing Russia on the verge of centuries.

Of course there are no indisputable arguments in favour of the population increase at any time and in any place. Besides, the population dynamics cannot be viewed separately from other changing demographic realities. Among other things a decline in the population increase, or even a population decrease, is to a larger or lesser degree compensated by a simultaneous rise in the total number of man-years lived, caused by the mortality reduction and by an increased life expectancy.

On moving from $e_o$ =50 years to $e_o$ = 75 for men and to $e_o$ = 80 for women (which is the way passed by many industrial countries in the 20th century), the total number of years lived by a cohort increases by the factor of 1.5 for men and 1.6 for women. Therefore, in a certain respect, the current 725 million Europeans occupy more place on the Earth than one billion people who lived on it on the verge of 19th and 20th centuries. In the same sense, the 145 million of today's inhabitants of Russia, even with its relatively low for the end of 20th century life expectancy of 67 years for both sexes, are equivalent to about 280 million of Russians at the beginning of the 20th century, when the life expectancy did not reach 35 years.

As to the future, should an optimistic mortality decrease scenario realize in Russia even in the case of a constant low fertility (scenario IB), its projected population of 103 million would be equivalent to about 125 million in 1950. If however it could be possible to maintain the present population size (scenario IIB), it would in 2050 be equivalent, in the terms of the total number of years lived, to more than 175 million in 1950.

However, where Russia is concerned, all such considerations should play a limited role due to a well and long known discrepancy between the population and the territory size of the country. Russia has always been an underpopulated, and this underpopulation has become especially apparent after the desintegration of the USSR, from which Russia has inherited a three quarters of the territory but just a half of the population.

Even the more populated European part of Russia is comparable, with respect to the population density, to the territory of the USA (27 persons per square kilometer in the European Russia against 29 in the USA). When compared to the Western Europe, even the historical center of Russia does not seem too much populated. One fifth of the country's population is concentrated in the Central economic region occupying less than 3% of its territory. However even in that region the population density of 62 persons per square kilometer is just above a half of that in the European Union as a whole (119 per square kilometer).

As to the Asian part of the country, the problem of its adequate population has never been solved. The Asian Russia occupies 75% of the whole country's territory but accommodates only 22% of its population, at an average population density of 2.5 persons per square kilometer. The demographic potential of Siberia and the Russian Far East is clearly insufficient for exploiting their rich natural resources and for creating a developed and more or less continuous economic and settlement structure.

Being already unsatisfied with its present population size, Russia would moreover experience difficulties caused by its decrease, even if partly compensated by an increased life expectancy. In the world suffering from overpopulation, Russia is still an

underpopulated country, which makes it especially sensitive to the population decrease and compels to seek ways of struggling against depopulation.

### *2. Consequences of population aging*

Unfavorable consequences of population aging are less apparent. In generally it should be noted that a certain mythology exists in demographic and economic literature, which, on one hand, exaggerates negative consequences of the population aging and, on the other hand, humpers the search for remedies against the real problems caused by aging.

#### *a. Years lived by a cohort: a new structure of a life-time*

The fundamental processes, leading to irreversible changes in the population pyramid, are taking place at a generations level. As a result of the mortality decrease and of the rectangularization of the curve of survivorship, a general increase in the number of years lived by a cohort is accompanied by an even faster increasing number of years lived in the adult and, especially, in the old ages. As a result of this evolution, the upper part of the pyramid of the time lived by a generation is continuously gaining weight. Hence the anxieties regarding a heavy burden upon the aging nations' economies effected by the rise of the time lived by citizens of the pension age, who are consumers without being producers.

Should however one forget that a person who lived up to the old age had had before to pass through all the middle age groups? As the mortality decreases, a total number of man-years rises, including those productive and not only consuming.

As mentioned above, on moving from $e_o$ =50 years to $e_o$ = 75 for men and to $e_o$ = 80 for women, the total number of years lived by a cohort (and therefore the consumption time) increases by the factor of 1.5 for men and 1.6 for women. However, the number of years lived in the adult age (the "productive period") rises almost by the same factor. For example, according to the Coale & Demeny model life tables (model 'West') it rises by 1.44 for men and 1.47 for women for the ages of 15 to 65, and by 1.51 and 1.54, correspondingly, for the ages of 20 to 65. As to the ratio between the years lived in the "dependency period" and in the "productivity period", it remains practically unchanged.

Of course, from the economic point of view, the issue is crucial of age profiles of consumption expenditures or needs and the ratio between the levels of per-head expenditures in the first and second dependency periods. If they are about the same, then the introduction of this economic variable makes no effect upon the conclusions from a purely demographic analysis. If however the per-head expenditures of elderly dependants are much greater than those of children, then an increased burden of the second "dependency period" is not compensated, in the economic sense, by an decreased burden of the first period.

This issue must be recognized as insufficiently studied, with opposing views appearing in the literature and with greatly varying estimates made by different authors. For example the authors of a relatively recent study of economic consequences of population aging in industrialized societies concluded that even if the difference in per

capita consumption at the opposit end of the age spectrum exists it is not very important and its 'impact on overall needs or consumption expenditures are relatively limited' (ECE Secretariat, 1992, p. 197; see also ECE Secretariat, 1983). Some other studies, on the contrary, 'have estimated that for an industrialized country, on average the cost to support a person aged 65 years and over is substantually greater [roughly two and a half times greater] than the cost to support a young person less than 20 years old' (UN Population Division, 2000, p. 93).

In any case, private (individual, family) expenditures should be discerned from public (governmental and other) ones. Child-bearing and rearing largely remains, in all modern societies, a family matter (even with a significant participation of the public institutions), while the elderly are mainly supported by means of pension systems. Therefore, if the first and second dependency periods are compared with regard to the *public* per-head expenditures only, the second period might in fact turn out to be more expensive. (By the way, this may explain the obvious dramatization of the aging problem: the governments are concerned about their increasing share of the economic responsibility for the population welfare). However, the part of the population that lives in the "productive period" provides for both dependency periods, regardless of the channels used for distributing the resources produced by that part.

While remaining within the "generation logic", one should take into account that a person enters his/her second "dependency period" 40 – 50 years after leaving the first one, during which time the society's wealth has grown. Other conditions being equal, the society becomes now capable of supporting, without excessive strain, the elderly' expenditure at a level much higher than that existed during their childhood, when their needs were largely formed.

Like any changes, the transition to a new structure of the generation lifetime generates problems related to the adaptation of the social institutions to new demographic realities. The creation of pension systems is one of the prominent responses to this challenge of the 20th century. However, the demographic changes themselves have predetermined the economic possibility of such a response, particularly by permitting, *ceteris paribus*, to increase, almost by the factor of 1.5, the generation's potential fund of working time. This fact undermines an excessive dramatization of aging as a *demographic* problem.

*b. Age composition of real populations*

Should the populations live for a long time under stable demographic conditions (i.e., constant fertility and mortality rates), the cohort-related analysis could be also applied to the real population. However, the 20th century was not a period of stability, but just on the contrary: a time of huge changes in fertility and mortality and of the quest for their new equilibrium. The populations, one by one, moved to a new type of intra-generational solidarity. A new, if never explicitly proclaimed, principle was pursued: let each new generation live the same number of years as the preceding one lived but this should be achieved not due to the longevity privilege for a few, paid for with premature deaths of the majority, but rather due to the life protection and prolongation for as many newborns as possible. Naturally enough, this had lead to a redistribution of economic

resources within the whole time space occupied by a generation in favor of the increasingly more part of this space occupied by the old age groups, and to the rejection of the part of births which, under the high mortality conditions, were a net loss in either demographic or economic sense.

As a result of the fertility decline, every consequent generation was less numerous than the preceding one, which was the main immediate cause of the aging observed in most countries in the 20th century. The population pyramid changes its form owing not to the widening of its upper part but due to the narrowing of the lower one. Under such circumstances (which are a priori transitional and temporary) the elderly dependants belong to more populous generations than the adults filling the middle part of the age pyramid, and here a certain discrepancy may really appear.

However one should not exaggerate the extent and significance of this discrepancy. The changes are occurring more or less gradually and the dependency ratio of the elderly is rising progressively, so this evolution cannot produce any abrupt perturbations and economy may well adapt to such changes. In any case, the wealthy industrial nations with an "old" age composition must bear the dependency burden of the elderly *after* their having already contributed to the economic growth. The situation is worse in the developing countries, where the main economic burden is caused by children who have not yet participated in the production of the total wealth, which is modest by itself.

It should be added here that in the 20th century in Russia, like in some other European countries, the gradual shifts in the age composition caused by evolutionary demographic changes were accompanied with sharp fluctuations (caused by the reasons far from demographic ones) of the age composition and, correspondingly, of the economic burden upon the adult population. In the second half of the 60s the total age dependency ratio in Russia was 55-57 per 100 adults. Such a high value will be achieved again (and then according to only some of the considered scenarios) not before 2035. Such a rise should of course be prepared for, but it should hardly be over-dramatized. If Russia was able to confront it in 1965, why should it be so dangerous 70 years after that?

## D. CONCLUSIONS

In Russia, like in most industrial countries, the balance of births and deaths will most likely be such in the first half of the 21st century that the natural population increase will be negative. If the country's population will continue to depend largely on the natural reproduction, it will unavoidably decrease in size and will age rapidly. These two trends might be counteracted only by an inflow of immigrants, to a larger or smaller extent, depending on the volume and composition of immigration flows.

Within the frameworks of the considered scenarios, this volume ranges from 34.5 million (the scenario IID) to 117.6 million (the scenario IIIA) over 50 years (689 to 2,352 thousand per year). In order to estimate the feasibility of such parameters, it would be useful to compare them with the actual volumes of net migration to Russia in 1950 - 2000. It amounted to 3.4 million (69 thousand per year) over 50 years, 5.8 million (232 thousand per year) over the last 25 years, and , 4.5 million (300 thousand per year) over the 15 year period when it was the highest (1984 to 1998).

Against such a background, even a minimal annual net migration on the order of 700 thousand during the next 25 years (the scenarios IIB and IID) seems too large and therefore not very probable and thus much less feasible appear the migration volumes necessary for the realization of the series D scenarios (an annual population increase by 0.5%), i.e. 1.5 to 1.9 million per year in 2000 – 2025 and 1.5 to 2.8 million per year in 2025 – 2050.

Nevertheless, Russia could unlikely avoid the arrival of large immigration inflows.

On one hand, their inevitability is dictated by the internal demographic situation in Russia. While unfavorable consequences of the population aging are not so dramatic as sometimes imagined, and those actually present may be largely neutralized by economic and social policy measures, the population decrease will present Russia with a very hard choice. It should either succumb to a continuous aggravation of the already meager population / territory ratio, or to widely open its doors to immigration. Both solutions bear unwelcome consequences, so the lesser of two evils should be chosen.

On the other hand, the future developments cannot be predicted without taking into account the demographic situation outside Russia, particularly the overpopulation beyond its southern frontiers. This overpopulation together with the increasing mobility of the populations in the neighbouring countries will unavoidably produce a growing migration pressure, at least in the form of illegal migration, that will become more and more difficult to hold in check and which will compel Russia to respond with expanding the legal immigration possibilities.

Eventually a certain equilibrium of pull and push factors would be probably achieved, along with a corresponding annual rate of the net-migration in Russia. It will most likely be greater than the current rate. However, one can hardly rely on its ability of neutralizing the unfavorable consequences of the present demographic trends, in particular of the fertility decline much below the replacement level.

***References:***

ECE Secretariat (1983). Economic Implications of Aging in the ECE Region: Some Selected Aspects. In: *Economic Bulletin for Europe*, vol. 35, No 3, United Nations.

ECE Secretariat (1992). Economic Implications of Aging in the ECE Region: Some Selected Aspects. In: *Demographic Causes and Economic Consequences of Population Aging. Europe and North America*. George J. Stolnitz, ed. UN Economic Commission for Europe. Economic Studies No. 3. New York: UN.

UN Population Division (2000). *Replacement Migration: Is It a Solution to Declining and Ageing Populations?* UN, ESA/P/WP.160.

Vishnevsky, Anatoly and Shkolnikov Vladimir (1997). *Mortality in Russia: Main Groups of Risk and Action Priorities.* Proceedings of the Moscow Carnegie Center, Vol. 19. (In Russian).

Zayonchkovskaya Zhanna (1999). Migration. In *Population of Russia 1999.* Anatoly Vishnevsky, ed. Moscow, Knizhny Dom Universitet. (In Russian).

TABLE 1. POPULATION PROJECTION FOR RUSSIA, 2000 – 2050: MAIN ASSUMPTIONS AND RESULTS

| Year or period | *Scenarios with zero migration* | | | | *Scenarios witn zero population growth* | | | | *Scenarios witn 0.5% annual population growth* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Scenario I A* | *Scenario I B* | *Scenario I C* | *Scenario I D* | *Scenario II A* | *Scenario II B* | *Scenario II C* | *Scenario II D* | *Scenario III A* | *Scenario III B* | *Scenario III C* | *Scenario III D* |
| | *TFR=1.3 const. $e_0$* | *TFR=1.3 incr. $e_0$* | *TFR=2.0 const. $e_0$* | *TFR=2.0 incr. $e_0$* | *TFR=1.3 const. $e_0$* | *TFR=1.3 incr. $e_0$* | *TFR=2.0 const. $e_0$* | *TFR=2.0 incr. $e_0$* | *TFR=1.3 const. $e_0$* | *TFR=1.3 incr. $e_0$* | *TFR=2.0 const. $e_0$* | *TFR=2.0 incr. $e_0$* |
| *A. Total fertility rate* | | | | | | | | | | | | |
| 1959 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 | 2.60 |
| 1975 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 | 1.98 |
| 2000 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 |
| 2025 | 1.30 | 1.30 | 1.50 | 1.50 | 1.30 | 1.30 | 1.50 | 1.50 | 1.30 | 1.30 | 1.50 | 1.50 |
| 2050 | 1.30 | 1.30 | 2.00 | 2.00 | 1.30 | 1.30 | 2.00 | 2.00 | 1.30 | 1.30 | 2.00 | 2.00 |
| *B. Male's life expectancy* | | | | | | | | | | | | |
| 1959 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 | 63.2 |
| 1975 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 | 62.6 |
| 2000 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 | 59.9 |
| 2025 | 59.9 | 68.6 | 59.9 | 68.6 | 59.9 | 68.6 | 59.9 | 68.6 | 59.9 | 68.6 | 59.9 | 68.6 |
| 2050 | 59.9 | 77.0 | 59.9 | 77.0 | 59.9 | 77.0 | 59.9 | 77.0 | 59.9 | 77.0 | 59.9 | 77.0 |
| *C. Female's life expectancy* | | | | | | | | | | | | |
| 1959 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 |
| 1975 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 | 73.2 |
| 2000 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 | 72.5 |
| 2025 | 72.5 | 77.9 | 72.5 | 77.9 | 72.5 | 77.9 | 72.5 | 77.9 | 72.5 | 77.9 | 72.5 | 77.9 |
| 2050 | 72.5 | 83.0 | 72.5 | 83.0 | 72.5 | 83.0 | 72.5 | 83.0 | 72.5 | 83.0 | 72.5 | 83.0 |
| *D. Average annual net migration (thousands)* | | | | | | | | | | | | |
| 1950-1975 | -94 | -94 | -94 | -94 | -94 | -94 | -94 | -94 | -94 | -94 | -94 | -94 |
| 1975-2000 | 232 | 232 | 232 | 232 | 232 | 232 | 232 | 232 | 232 | 232 | 232 | 232 |
| 2000-2025 | 0 | 0 | 0 | 0 | 1040 | 738 | 1002 | 702 | 1878 | 1550 | 1836 | 1510 |
| 2025-2050 | 0 | 0 | 0 | 0 | 1712 | 1066 | 1263 | 677 | 2825 | 2028 | 2268 | 1542 |
| 1950-2000 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| 2000-2050 | 0 | 0 | 0 | 0 | 1376 | 902 | 1133 | 689 | 2352 | 1789 | 2052 | 1526 |

TABLE 1. POPULATION PROJECTION FOR RUSSIA, 2000 – 2050: MAIN ASSUMPTIONS AND RESULTS
(*Continued*)

| Year or period | *Scenarios with zero migration* | | | | *Scenarios witn zero population growth* | | | | *Scenarios witn 0.5% annual population growth* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Scenario I A* | *Scenario I B* | *Scenario I C* | *Scenario I D* | *Scenario II A* | *Scenario II B* | *Scenario II C* | *Scenario II D* | *Scenario III A* | *Scenario III B* | *Scenario III C* | *Scenario III D* |
| | *TFR=1.3 const. $e_0$* | *TFR=1.3 incr. $e_0$* | *TFR=2.0 const. $e_0$* | *TFR=2.0 incr. $e_0$* | *TFR=1.3 const. $e_0$* | *TFR=1.3 incr. $e_0$* | *TFR=2.0 const. $e_0$* | *TFR=2.0 incr. $e_0$* | *TFR=1.3 const. $e_0$* | *TFR=1.3 incr. $e_0$* | *TFR=2.0 const. $e_0$* | *TFR=2.0 incr. $e_0$* |
| *E. Total net migration (thousands)* | | | | | | | | | | | | |
| 1950-1975 | -2358 | -2358 | -2358 | -2358 | -2358 | -2358 | -2358 | -2358 | -2358 | -2358 | -2358 | -2358 |
| 1975-2000 | 5800 | 5800 | 5800 | 5800 | 5800 | 5800 | 5800 | 5800 | 5800 | 5800 | 5800 | 5800 |
| 2000-2025 | 0 | 0 | 0 | 0 | 25989 | 18438 | 25057 | 17544 | 46962 | 38760 | 45912 | 37750 |
| 2025-2050 | 0 | 0 | 0 | 0 | 42800 | 26639 | 31583 | 16926 | 70626 | 50688 | 56693 | 38550 |
| 1950-2000 | 0 | 0 | 0 | 0 | 3442 | 3442 | 3442 | 3442 | 3442 | 3442 | 3442 | 3442 |
| 2000-2050 | 0 | 0 | 0 | 0 | 68789 | 45077 | 56640 | 34470 | 117588 | 89448 | 102605 | 76300 |
| *F. Total population (millions)* | | | | | | | | | | | | |
| 1950 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 | 102.2 |
| 1975 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 | 134.2 |
| 2000 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 | 145.6 |
| 2025 | 121.4 | 128.0 | 122.2 | 128.8 | 145.6 | 145.6 | 145.6 | 145.6 | 164.9 | 164.9 | 164.9 | 164.9 |
| 2050 | 86.5 | 103.3 | 94.5 | 111.7 | 145.6 | 145.6 | 145.6 | 145.6 | 186.8 | 186.8 | 186.8 | 186.8 |
| *G. Old age dependency ratio (65+)/(15-64), per 100* | | | | | | | | | | | | |
| 1939 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 1959 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| 1975 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| 2000 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| 2025 | 27 | 25 | 27 | 29 | 26 | 24 | 26 | 28 | 25 | 27 | 25 | 27 |
| 2050 | 41 | 41 | 39 | 50 | 33 | 36 | 33 | 45 | 31 | 40 | 31 | 41 |
| *H. Total dependency ratio [(0-15)+(65+)]/(15-64), per 100* | | | | | | | | | | | | |
| 1939 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| 1959 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| 1975 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 |
| 2000 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| 2025 | 47 | 45 | 48 | 50 | 46 | 44 | 47 | 49 | 46 | 48 | 47 | 48 |
| 2050 | 60 | 58 | 66 | 75 | 53 | 54 | 61 | 71 | 52 | 61 | 60 | 69 |

**Figure I. Population of Russia, 1950 to 2050**

**(2000 to 2050 - by projection variants)**