

The number of potential entrants will decrease permanently from 2005 and by 2010 will reduce by more than a quarter compared to 2004.

The problems of the population structure formation and its reproduction parameters are national level problems, not regional. Only state economical, social and demographical policy can significantly change actual situation regarding birth rate, death rate and migration.

But in order not to finish pessimistically, I'd like to remind a saying: «People are mortal, but peoples are immortal!» and express my confidence in the wisdom, understanding and potential of both Ukrainian people and authorities which will allow them to fight this crisis.

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FERTILITY IN THE CONTEXT OF POPULATION AGEING IN UKRAINE: STATISTICAL ANALYSIS AND SIMULATION

Introduction

The research concerns the problem of sharp falling crude birth and fertility rates in conditions of stable population ageing in Ukraine. This paper presents the results of statistical analysis fertility in historical aspect and also the influence of some factors. It shows the cause-and -effect relationship between the fertility and population ageing trends. The results of imitative modeling allowed identifying the reproductive behavior of the population and its impact on the change of gender and age composition of the Ukrainian population for the near-term outlook.

The phases of fertility trend

Fertility does not only imply the reproduction of the population but also has a considerable impact on its age-sex structure. Higher fertility leads to a higher a number of children i.e. it rejuvenates the population. Furthermore, a steady increase in the number of newborns to some extent strengthens the sex structure of the population in favor of males inasmuch as boys tend to prevail among newborns. It is common knowledge that the male age structure is mostly younger than the female one. Thus, even if fertility is maintained on a medium level and other conditions remain stable, it will counteract the ageing of the population. In turn, the ageing of the population adversely impacts the intensity of fertility as it engulfs the childbearing and potentially childbearing groups of the population. Hence, the ageing of the popu-

lation is interdependent on fertility, and both these processes need to be analyzed in parallel.

Fertility in Ukraine is steadily decreasing. This downward fertility trend can be divided into three phases. The first phase spanned the baby boom period after World War 2 through 1965, when the total fertility rate in Ukraine was average according to the international assessment scale (from 23 % to 16.5 %) and annually, over the next 15 years, it was decreasing by an average of 2.1 % to.

The next phase (1965—1991) was characterized by a transition to a new mode of fertility, with the total fertility rate fluctuating within a low level (from 16‰ in 1983 to 12.1‰ in 1991). During that phase the total fertility rate was decreasing still more rapidly, with an annual decrease of 2.5 %. However, during that phase there were two years with the highest number of children born in the past 40 years (1964—2004). The first year was 1983 when 807,1 thousand newborns were born, and the second year was 1986 with 792,6 thousand newborns. Such an explosion-like increase in the number of newborns had demographic causes, as the children born in those two years are the children born to parents, who had been born during the baby boom period after the war. Ukraine was the baby boom in 1959 (880,5 thousand). By correcting this year with an average life of a female population, which was about 24 years, we get the year of 1983.

The third phase coincided with the period of Ukraine's independence. From 1992 till 2001 Ukraine saw an extremely low fertility rate (by 10‰), with the bottom rate being in 2001 when a little more than 7 children were born per 1,000 residents (7.7‰). In those 10 years the total fertility rate was decreasing from year to year by an average of 3.85 % (Fig.1). The last two years attested to an improvement of the situation, when the total fertility rate started to increase reaching 8.5 % across Ukraine in 2003.

Fertility improved in rural areas (9.1‰), especially in urban localities where the total fertility rate increased by 15.3 % as compared with the critical year of 2001, reaching 8.3‰ in 2003. The childbearing activity in urban localities has intensified in recent two years. To some extent, it has to do with labor and educational intra-regional and inter-regional migration from villages to cities, with the highest number of migrating women aged 15—19 (24 % of all migrating women) and 20—24 (respectively 18 %).

However, despite recent positive changes Ukraine's fertility is still very low, and between two censuses it reduced by 36.1 %, with urban fertility rates dropping lower (–39 %) than rural ones (–29.5 %).

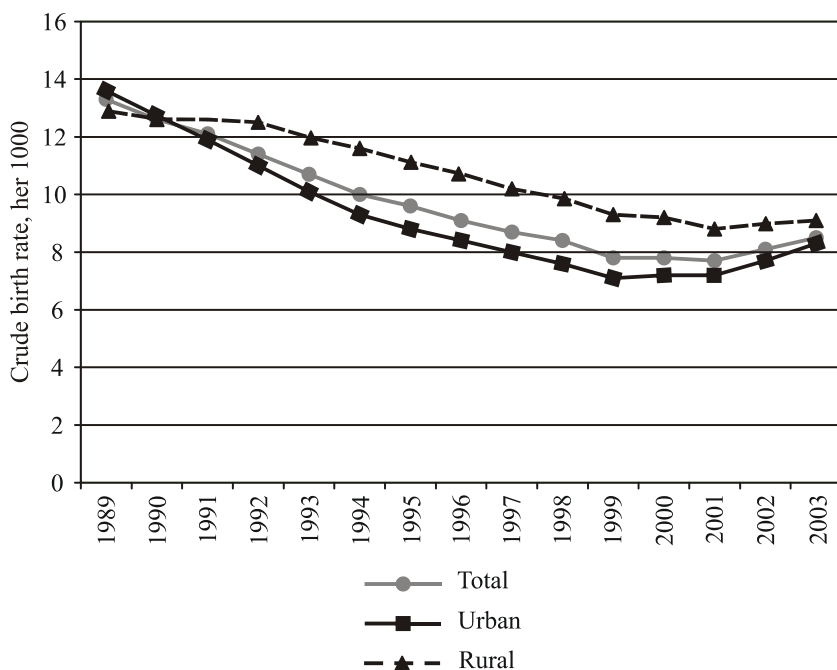


Fig. 1. Crude birth rates in Ukraine by urban and rural, 1989—2003 pp.

A similar trend is peculiar to fertility among women of reproductive age. During 15 years between the two censuses the total fertility rate decreased by 41.4 %, and in 2003 it was 32.7‰ for entire Ukraine. Namely, on average fewer than 33 children were born per 1,000 women of reproductive age annually, which corresponds to an extremely low level according to the international scale (up to 40‰). In 2003 the total fertility rate was 1.2 children against the minimum rate of 1.09 in 2001, i.e. in two years it rose by 10.1 %, but continues to be extremely low. Thus, according to 2003 data, on average every Ukrainian woman throughout her reproductive life was able to give birth to a little more than one child. As the things are, even the reproduction of the existing number of population is possible only by half.

However, this indicator characterizes the potential fertility of a theoretical population of Ukrainian women. As a matter of fact, it is different from the actual parity. Currently, in Ukraine the actual parity is 1.58 children, including 1.46 children in urban areas, and 1.8 in rural areas. The most widespread both in urban and rural areas are the children of the first birth.

Causes of low fertility activity are somewhat of objective nature that has to do with the switch to the current mode of reproduction, which has taken place in most countries of the world. However, in Ukraine this coincided with a longstanding socio-economic and demographic crisis, which in turn caused a moral crises in social consciousness, lead to the reassessment of values, primarily among young people. This is not merely a loss of a traditional family with many children, this establishes a tradition of a family with one child with postponed or refused births spreading. According to the findings of the special survey «Reproductive health of the population of Ukraine — 1999» «only 43.6 % of births were planned, while the remaining 56.4 % were mistimed or unintended. Also, the percentage of mistimed and unintended births among urban populations was much higher and accounted for 57.7 % versus 45 % in rural areas. Statistically, reproductive motivation of women depends on their place of residence, although it is not very high (Kramer-test is 0,17).

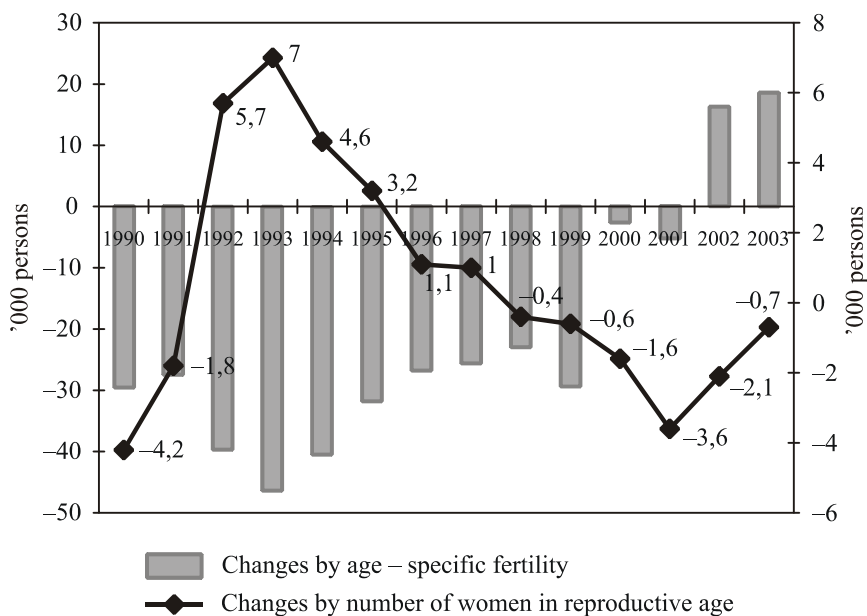


Fig. 2. Absolute changes of the number of births in Ukraine, 1990—2003

A question arises — why under such conditions did the objective fertility rate rise during the last two years and how long will this process last? There are different opinions regarding the current im-

provement in reproductive activity. Some scholars consider this process to be an offset to births postponed during the peak of the general crisis in the country. Others attribute this phenomenon to a temporary replenishment of the childbearing group as females born between 1983 and 1986 reached their reproductive age. Still, any assumptions would be more valid if they are based on statistical calculations. The index method allows assessing the «input» of specific factors in the fertility dynamics in Ukraine during the last period between the two censuses (Fig. 2).

On the whole, between the two censuses the number of newborns decreased by 282,4 thousand or by 40.9 % i.e. by more than one third. It should be noted that this was caused by the declining childbearing activity. If the mothers' generation had not been replenished, indirect losses in the population of Ukraine during that time would have been still bigger and would have reached 289,1 thousand people. Namely, Ukraine did not receive nearly 300,000 of the potential population due to the transition to a limited mode of fertility.

During the demographic crisis (1992—1995) due to women's declining childbearing activity the number of newborns annually decreased by an average of 39.6 thousand or 94 %, i.e. every year it decreased by 6 % on average. Thanks to the increase in the childbearing cohort these losses were less appreciable, and during the five years the number of newborns annually decreased by 34.5 thousand on average.

However, the positive effect of the extensive factor that is the replenishment of a cohort of potential mothers was short-lived, and from 1998 its action became opposite. As a result, in 2001 the number of newborns decreased by 3.6 thousand. However, the negative affect of this factor began to weaken as the largest generation born in 1983 reached their reproductive age. One may hope that in the following 10—15 years this factor will play a positive role. Besides, some promising signs in the birth intensity factor, which is even more important, have become conspicuous. In 2002 women's increasing fertility caused the number of newborns to raise in the past 15 years (by 16.3 thousand), and in 2003 the number of newborns exceeded the number of children born in the previous year by 18.6 thousand.

Such changes were due to increasing fertility almost in all age groups of the childbearing cohort (Table 1). The fertility of women of senior age groups (25—39 year-olds) was the most intensive i.e. it increased by 10 % annually.

Table 1

THE AGE-SPECIFIC FERTILITY RATES IN UKRAINE, 2001—2003

Age group, years	2001 p.	2002 p.	2003 p.	Growth rate, % 2003 to 2001	Annual growth rate, % 2002—2003
15—19	29,2	29,2	29,0	99,3	99,6
20—24	88,9	91,3	92,3	103,8	101,9
25—29	56,3	62,7	67,1	119,2	109,2
30—34	27,5	30,2	33,0	120,0	109,5
35—39	8,9	9,8	10,9	122,5	110,7
40—44	1,9	1,9	2,0	105,3	102,6
45—49	0,1	0,1	0,1	—	—
TFR, children	1,09	1,13	1,20	110,1	104,9

Specifically, the childbearing activity of women aged 35—39, the age when a second child is normally born, increased by 22.5 % in the three comparative years, or it increased by 10.7 % annually during this period. Thus, it is quite fair to assume that the «compensatory» process of has come into play to make up for previously delayed births. Some improvement in the population's welfare also contributes to it, and still more does the population's acclimatization to the existing conditions of life. The implementation of state family planning and reproductive health programs, schemes of financial support for parents etc. has produced some positive results. One can see that it has had an impact on the mature groups of the childbearing population. Thus, the increase in the childbearing activity in Ukraine is accompanied by some «ageing» of the mothers' cohort.

Ageing of the mothers' generation

The age of the mothers' generation is a peculiar indicator of the population ageing, and a generalizing indicator of childbearing activity. Specifically it reflects.

The mothers' population of Ukraine is traditionally considered to be rather young, especially in comparison with other European countries. According to the 2003 data, the average age of mothers in was 25.4 years, which in comparison with such European countries as Spain — 30.6 years (1998), the Netherlands — 30.3 years (1999), Sweden — 29.8 years (1999), Switzerland — 29.7 years (1999), is rather young. On the one hand, it can be attributed to Ukrainian women's inclination to early childbearing and marriage, and on the other hand, it can be more attributed to the short duration of childbear-

ing activity, which is, as a rule, ceases by the age of 30. Thus, in 2003 the contribution of mothers under 30 in the total fertility rate was 80.4 %, including mothers in urban areas — 78.9 % and mothers in rural areas — 83.3 %. Let us look at the changes in the average age of mothers during 1992—2003 in terms of population aging (Fig. 3).

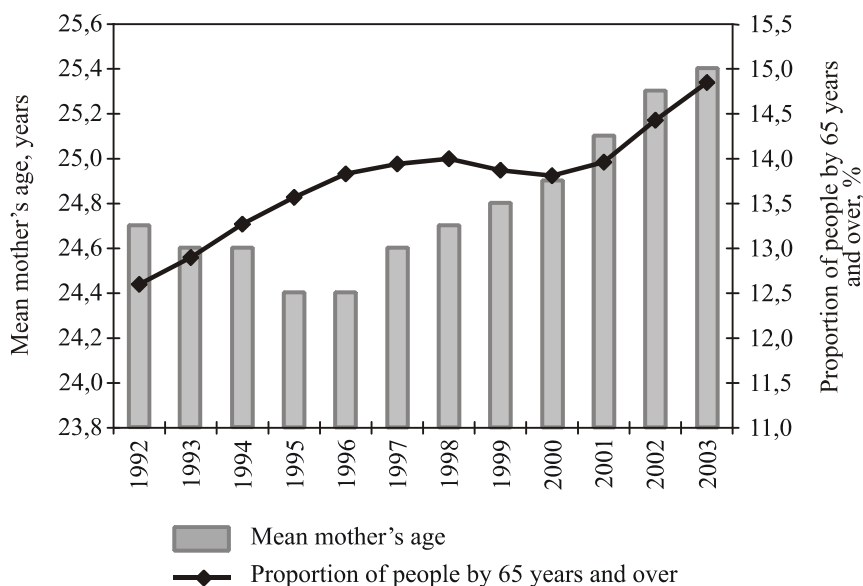


Fig. 3. Trends of mean mother's age and proportion of old people in Ukraine, 1992—2003

One can see that during the last 20 years changes in both the indicators were not unidirectional. The population-ageing rate had two peaks (1998 and 2003), while the average age of mothers was moving along the parabolic curve, with minimal values in the hardest years of the crisis — 1995 and 1996. A steadily increasing average age of mothers has been taking place in recent years (2001—2003). This has to do with the increasing childbearing activity especially among women at the age of 25—39 (Table 1). If the process of postponed births continues, which is quite probable, one can expect further ageing of Ukrainian mothers in the next years. This process can also be intensified by the prolongation of the socialization period, especially for urban women, who will refrain from having the first child while they receive education and gain employment. However, the mothers' ageing tendency agrees with the general aging of the population of Ukraine.

Figure 4 shows that the curves reflecting changes in the total fertility rate and population-ageing rate «above» (percentage of persons aged 65 and above) are of mirror nature. It is noteworthy that during 1992—2001 the fertility rate clearly decreased while the percentage of elderly people increased, and vice versa. The curves reflecting changes in the total fertility rate and population-ageing rate «below» (percentage of children under 5) are almost identical.

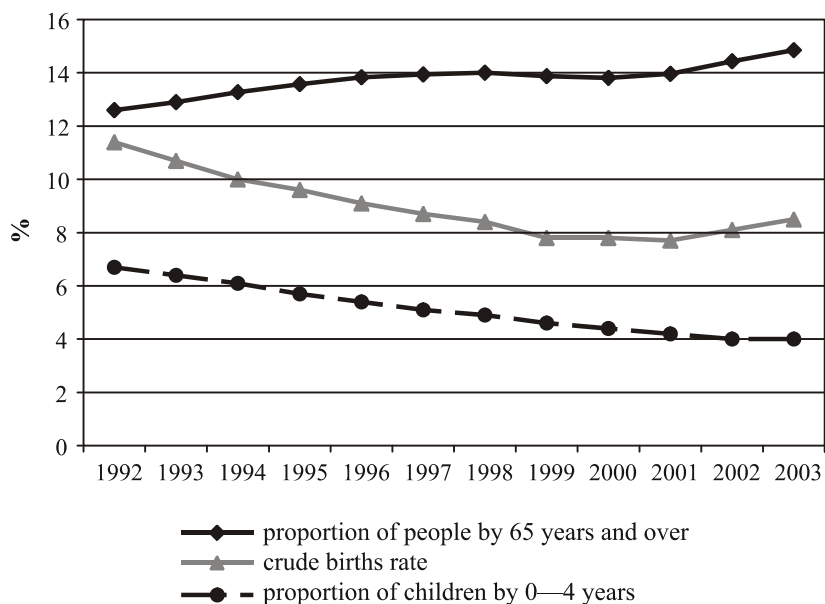


Fig. 4 Trends of fertility rate and coefficients of population ageing in Ukraine, 1992—2003

It is natural to ask how these indications will change in the nearest time to come.

Short-term projection of the number of newborns under the condition of population

To assess possible changes in fertility in Ukraine in terms of population ageing imitative modeling of natural and migration reproduction was done with the help of the «DemProj» module. The module requires that specific initial demographic parameters and their hypothetic levels be entered. Such hypothetic levels can be established by experts or as trend assessment. It was trend assessments

that were used to make short-term projections for the nearest five years (2002—2007). The modeling resulted in projection assessment of demographic processes and the population of Ukraine according to two scenarios.

The first scenario (optimistic) shows that all demographic parameters will change in an evolutionary manner, i.e. will tend to change as they did in the last 15 years, except fertility rate indicators. For the latter the dynamics of the improving situation were entered. In the second scenario also reflected evolutionary changes in population reproduction, however, fertility indicators were fixed in time at the level of the initial year of the projection for 2002.

Table. 2

PROJECTED FERTILITY AND REPRODUCTIVE RATES IN UKRAINE IN 2007

Characteristics	Forecast for 2007		Difference
	Scenario 1	Scenario 2	
Number of birth, 000's	474,2	400,9	73,3
Crude birth rate, ‰	10,2	8,6	1,6
Total fertility rate, children	1,34	1,13	0,21
Net reproduction rate, daughters	0,63	0,53	0,1
Mean age of mother's, years	25,8	25,4	0,4

It is obvious that under the optimistic scenario there is a considerable increase in the number of newborns as compared with 2003 by 65.6 thousand, and in comparison with the second scenario by 73.3 thousand. If positive changes in the childbearing process continue, fertility will increase up to 10.2‰.

If the situation remains as it was in 2002, the fertility rate will be 8.6‰. Under any conditions the mothers' generation and Ukraine's population on the whole will continue to age. Specifically, the percentage of elderly persons will range within 16.38 % — 16.47 % depending on the scenario (Table 3). Namely, current positive changes in the fertility rate won't considerably affect the ageing of the Ukrainian population «above», and the difference in indicators will remain at around 0,1 %.

Table 3

**PROJECTED UKRAINIAN POPULATION SIZE AND COEFFICIENTS OF
POPULATION AGING IN 2007**

Characteristics	Forecast for 2007		Difference
	Scenario 1	Scenario 1	
Total population, million	46,63	46,38	0,25
Number of children (0—4 years), million	2,24	1,98	0,26
Number of old people (65 years and over), million	7,64	7,64	0
Proportion of children (0—4 years), %	4,74	4,28	0,46
Proportion of old people (65 years and over), %	16,38	16,47	-0,09

Under such a development of the situation the age composition of Ukraine's population may change. The comparison of two sex-age pyramids indicates certain structural changes (Fig. 5,6). According to the first scenario the sex-age pyramid will be substantially changed only among children of the youngest age (0—4 years), which is a direct consequence of the projected increase in the number of newborns (to 474.2 thousand in 2007).

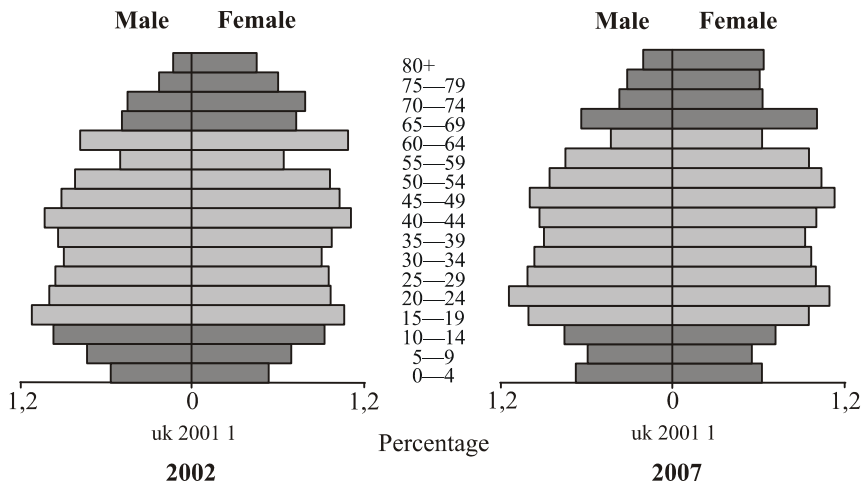


Fig. 5. Actual and projected sex-age pyramids of Ukrainian population. In other generations structural changes will occur, as all age group will move ahead 5 projected years. As a result of only evolutionary changes the percentage of people of the most active reproductive age

(20—24 years) will grow, which will considerably increase fertility. However, every next generation of three five-year generations (15—19, 10—14, 5—9 years) will become less numerous. Thus, in the next 15 years the exhaustion or temporary depopulation of the reproductive potential will be observed. One shouldn't hope for a steady increase in fertility in a longer outlook (25—30 years). Even if the reproductive behavior of women aged 25—39 during the abovementioned period remains as it was in 2003, it is not likely to compensate possible losses in the number of a new generation of newborns because of an extremely limited childbearing cohort of the generation born between 2000 and 2001. Given this small in number generation of children, it is necessary to identify prospective needs for pre-school and school institutions, because it will be this generation that will come there in 2007.

At the same time the cohort of working age people will somewhat grow. This should be taken into consideration during further formation of the labor market, planning of workplaces and state regulation of the population employment in Ukraine. During this time one should not hope for a substantial increase in the number of vacancies due to redundancy of retirement age persons. Despite further increase in the number of retirees, the percentage of «new» pensioners aged 60—64 will be very small in 2007, amounting only to 3.9 % of the total population against 6.9 % in 2002 respectively. An almost double (by 1.77 times) decrease in the number of the above age group can be attributed to the historic time of their birth, i.e. the years of 1943—1947.

If the fertility situation remains the same (scenario 2), the generation of children aged 0—4 will remain within the percentage of the previous, very limited five-year group. No marked changed will occur in other age groups (Fig. 6).

To sum up the results of both the scenarios, one can say that the only way to preserve the demographic potential in Ukraine is to encourage the current positive fertility trends. The state strategy should not only include one-time benefits and payments to postpartum women and young families, especially since their size does not even compensate losses related to labor, especially in urbanize areas of Ukraine. It is impossible to increase the number of children in Ukrainian families only though periodic financial incentives for them. A multidirectional state program should be developed, which would (1) preserve the reproductive population of the country; and (2) encourage it to perform its reproductive function. To attain the first objective it is necessary to create priority conditions for youth people in terms of their employment in Ukraine, rather than impel girls and young women to seek livelihood abroad. While losing the active childbearing

contingent because of labor (mostly unofficial and illegal) migration, Ukraine does not receive the total number of newborns both of the first and second priority of birth.

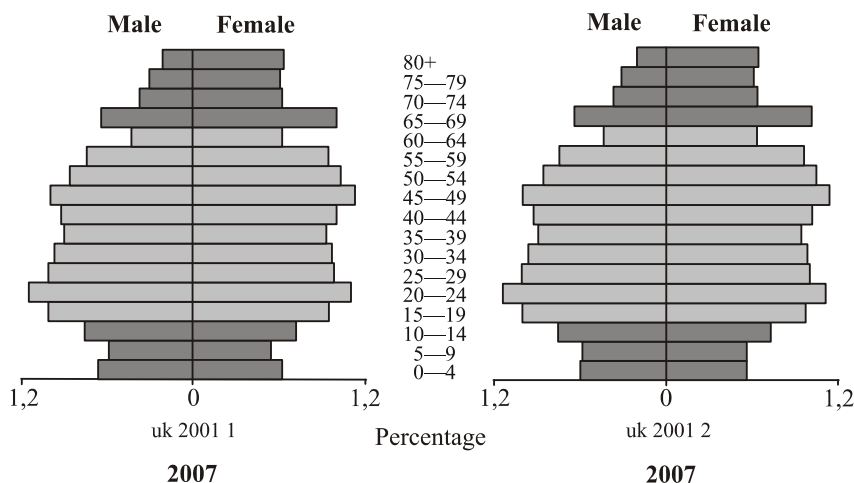


Fig. 6. Projected sex-age pyramids of Ukrainian population by two scenarios, 2007

The implementation of objective two should be based on a system of social and medical support for mothers and children, socio-economic guarantees in the employment of parents, preschool and school education of children, and housing. According to short-term projections, specific national activities should be launched immediately before favorable demographic opportunity is missed.

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STATISTICAL ESTIMATION OF COMPANIES' DISTRIBUTION ACCORDING TO THE RESOURCES' VALUE AND OBTAINED ECONOMIC ACTIVITY RESULTS

One of the major tasks of the subjects of economic activity, including insurance companies, is maintenance of stable development between individual subsystems on the correlation basis.

The important point in management of insurance activity efficiency is maintenance of proportionality between effect and resources. The special place is occupied by the estimation of distribution proportionality of profit as efficacious attribute and assets of insurance companies as factorial attribute.

With this purpose statistical methods of the proportionality analysis are applied on the basis of both localization and concentration coefficients, and the Lorenz curves.

The value of the localization coefficient estimated according to this method proves efficiency of using resources and specifies intensive or extensive type of development of the corresponding insurers' groups.

Calculation of concentration coefficient enables to speak about uniformity of profit and assets distribution.

The statistical analysis carried out according to these directions, enables to make the administrative decisions directed to increasing the efficiency of insurance companies' activity in Ukraine.

For such analysis it is necessary to select aggregate of insurance companies and to classify it. The aggregate of 50 insurance companies operating in Kiev are chosen in this article. The classifying factor is