DRAFT

Topic
Ageing and Intergenerational Relationships

Future trends of population ageing in Russia and Ukraine: a probabilistic view[#]

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Introduction

Understanding is deepening that a society in which most individuals can expect to lead a long and healthy life is a great achievement. However the need to develop sound medical and social services for the elderly Is recognized. In Russia and Ukraine where since the collapse of the USSR in 1991, old people have experienced numerous shocks that have worsened their living conditions and health status ageing issues are highly important.

Within the framework of a comparative study on the dynamics of demographic processes in Russia and Ukraine a number of aspects of demographic development were analyzed, and a number of similarities and diversities were revealed. It was shown that general trends of natural population movement for Russia and Ukraine had been similar while considerable differences in migration trends took place. Besides, changes in age structure were similar as well [4].

The primary needs of the people, which the development programmes aim to satisfy, cannot be gauged rationally without regard to the expected size and composition of the population, nor can the national resources be appraised adequately without considering labour, the supply of which depends primarily on population size and structure (United Nations, 1956). At present demographic forecasts are an integral part of socio-economic planning at different levels. They can serve for quantitative assessment of expected effects of different economic and social programmes which are launched for achieving certain results.

The paper aims at studying future trends of population ageing in Russia and Ukraine up to the year 2050 based on probabilistic projections. Changes in the total population size, proportions of population aged 65+ and 80+, old-age dependency ratio, median age for Russia and Ukraine are analyzed and compared.

Usual procedure creates population forecasts from an initial age-sex structure and deterministic forecasts of the total fertility rates (TFR), life expectancies at births (LE), and net migration. Traditionally medium, high and low variants/scenarios are considered. Probabilistic population forecasts specify future total fertility rates, life expectancies, and net migration as distributions and not as points [3]. Unlike a conventional approach giving a fixed number of variants (usually medium, low and high), a probabilistic one gives a “bunch” of trajectories, each of them can be realized with a certain probability. A probabilistic approach to population\projection is described for example in [1-3, 7].

Demographic forecasting in Russia and Ukraine has a long history and dates back to the 20-th (20-th century). In [5, 6] we examined a number of projections made in different Russian and Ukrainian institutions and by different researchers, e.g. Department of Demography (Institute for Statistics and Economic Stidies, Goskomstat of Russia), Centre for Economic Conjuncture under the Government of the Russian Federation, Centre for Demography and Human Ecology (Institute for Economic Forecasting, Russian Academy of Sciences), The National Institute for Strategic Studies (Ukraine), and others.

Since the 50s the UN Population Division has regularly made world population projections. A great advantage of the UN projections is that they have been made on the basis of the same methodology. They are well comparable, providing the standard and consistent set of population figures. The UN projection till 2050 embracing the population of the world, of different regions and countries is composed of four variants, i.e. high- medium- low and constant-variants. A feature peculiar to the UN projections is that the high and low variants differ from the medium-variant only on hypotheses about fertility dynamics.

In this paper results of our probabilistic projections are supposed to be compared with the UN World Population Prospects (The 2006 Revision) for Russia and Ukraine [8].

Comparisons with the UN World Population Prospects will be given in the final version of the paper.

Data of population censuses and vital statistics are used.

Assumptions

Table 1 shows the initial and forecasted values of the total fertility rates (TFR), life expectancies (LE), and net migration for the initial (2005), intermediate (2025) and the final (2050) year for Russia and Ukraine.

For the initial year 2005 the TFR for Russia (1.29) is higher than for Ukraine (1.22). Median and prediction intervals for Russia and Ukraine coincide: in 2050 the TFR is 1.53 (median) both for Russia and Ukraine, and there is a 95% probability that it will range between 1.02 and 2.09.

Unlike fertility, in the initial year life expectancies for Russia are lower than those for Ukraine (for males, for females, for males and females). Thus, in 2005 LE for males and females was 65.4 for Russia and 67.4 for Ukraine. But prediction intervals for Russia and Ukraine don't differ much.

Table 1 shows significant differences in assumptions about migration. Unlike fertility and mortality the ranges for net migration are very wide: in 2050 for Russia a 95% prediction interval is 60.1 – 299.9 thousand and –151.8 – 199.8 thousand for Ukraine.

The mentioned differences in assumptions about changes in main demographic processes will certainly affect dynamics of the total size and population age structure of Russia and Ukraine.

Projection results

Forecasted population sizes, median age, ageing characteristics (proportions of population aged 65 or over, 80 or over, old-age dependency ratio) are given in Table 2 and Fig. 1-8.

For both countries a monotonic total population size decrease is expected. By the year 2050 median total size may decrease (as compared with the initial year) by 23.5% for Russia and even more for Ukraine – by 30.5%.

In both countries ageing is expected to continue. For both countries the share of population 65+ will increase: in Russia in the whole population this proportion will increase from 3.7 in 2005 till 20.6% (median) in 2050, i.e. 90% increase as compared with the initial year is expected; for Ukraine the corresponding increase is expected to be about 65% (from 15.9% in 2005 to 26.3% (median) in 2050). It should be mentioned that changes in the proportion of 65+ in Russia and Ukraine have similar dynamics (both for males and for females): in 2007 – 2011 (for Russia)/2013 (for Ukraine) some decrease is expected followed by monotonic increase.

Increase of the proportion of 80+ is expected to be more significant than that of 65+: median proportion of 80+ in 2050 will be 3.1times higher than that in 2005 (6.2% as compared with 2.0) for Russia, and 2.5 times higher for Ukraine (6.2% as compared with 2.5%). Dynamics of the share of 80+ is more complicated than that of 65+ (both for Russia and Ukraine), and for Russia and Ukraine it is similar (see Fig.4, 5).

Old-age dependency ratio (both for Russia and Ukraine) behaves similar to the share of 65+ (see Fig. 2, 3, 5, 6). Corresponding graphs have similar shapes. For Russia in 2050 median old-age dependency ratio is expected to increase by 120% (from 19.3% to 42.5%) as compared with that in 2005, for Ukraine – by 87% (form 23.0% to 43.0%).

Conclusion

On the background of total population size decrease ageing process in Russia and Ukraine will develop. While values of the considered ageing characteristics and median age for Ukraine are expected to be higher than those for Russia, differences between them have been shown to decrease. Moreover, dynamics of the considered indicators for Russia and Ukraine is expected to be similar. Thus, positive experience of Russia /Ukraine in elaborating ageing well policies may be fruitfully used in both countries.

Progressing ageing has numerous profound and far-reaching consequences, and results of the study may contribute to more precise definition of corresponding economic, social and demographic policies for both countries.

Table 1. **Scenarios for the Total Fertility Rate (TFR), Life Expectancy at Birth (LE) and net migration, Russia and Ukraine, years 2005, 2025 and 2050.**

	2005		2025		2050	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
TFR						
60% prediction interval	1.29	1.22	1.24 – 1.54		1.33 – 1.78	
95% prediction interval			1.04 – 1.73		1.02 – 2.09	
MEDIAN			***1.38***		***1.53***	
	2005		**2025**		**2050**	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
LE						
MALES						
60% prediction interval	58.9	61.6	64.8 – 67.7	64.8 – 67.6	68.6 – 73.4	68.9 – 73.2
95% prediction interval			62.8 – 69.6	63.0 – 69.5	65.7 – 76.4	65.6 – 76.4
FEMALES						
60% prediction interval	72.3	73.6	75.8- 77.0	75.8 - 77.6	77.43- 80.6	77.63- 80.5
95% prediction interval			74.6 - 78.9	74.7 - 78.8	75.4 - 82.6	75.4 - 82.6
MALES AND FEMALES						
60% prediction interval	65.4	67.4	70.2 - 72.5	70.2 - 72.5	72.9 - 76.9	73.2 - 76.8
95% prediction interval			68.6 - 74.2	68.7 - 74.0	70.4 - 79.	70.40 - 79.4
MEDIAN						
males	***58.9***	***61.65***	***66.25***	***66.28***	***70.96***	***71.06***
females	***72.30***	***73.55***	***76.76***	***76.76***	***78.97***	***79.03***
males and females	***65.44***	***67.45***	***71.38***	***71.39***	***74.87***	***74.95***
	2005		**2025**		**2050**	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
Net migration (thousand)						
60% prediction interval	120	4.6	99.5 – 206.0	- 42.0 – 76.0	136.0 – 230.4	-51.4 – 100.1
95% prediction interval			29.7 – 279.7	- 112.0 – 157.0	60.1 – 299.9	-151.8 – 198.8
MEDIAN			***155.4***	***21.0***	***182.8***	***25.3***

Table 2. **Forecasted population sizes, ageing indicators and median age for Russia and Ukraine, years 2005, 2025 and 2050.**

Population size (mln)	**2005**		**2025**		**2050**	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
60% prediction interval	143.47	47.10	128.43- 132.80	39.45- 41.79	104.0- 115.30	29.78- 35.87
95% prediction interval			125.58-135.75	37.82- 43.45	94.37- 122.84	26.33- 39.84
MEDIAN			***130.69***	***40.63***	***109.69***	***32.75***

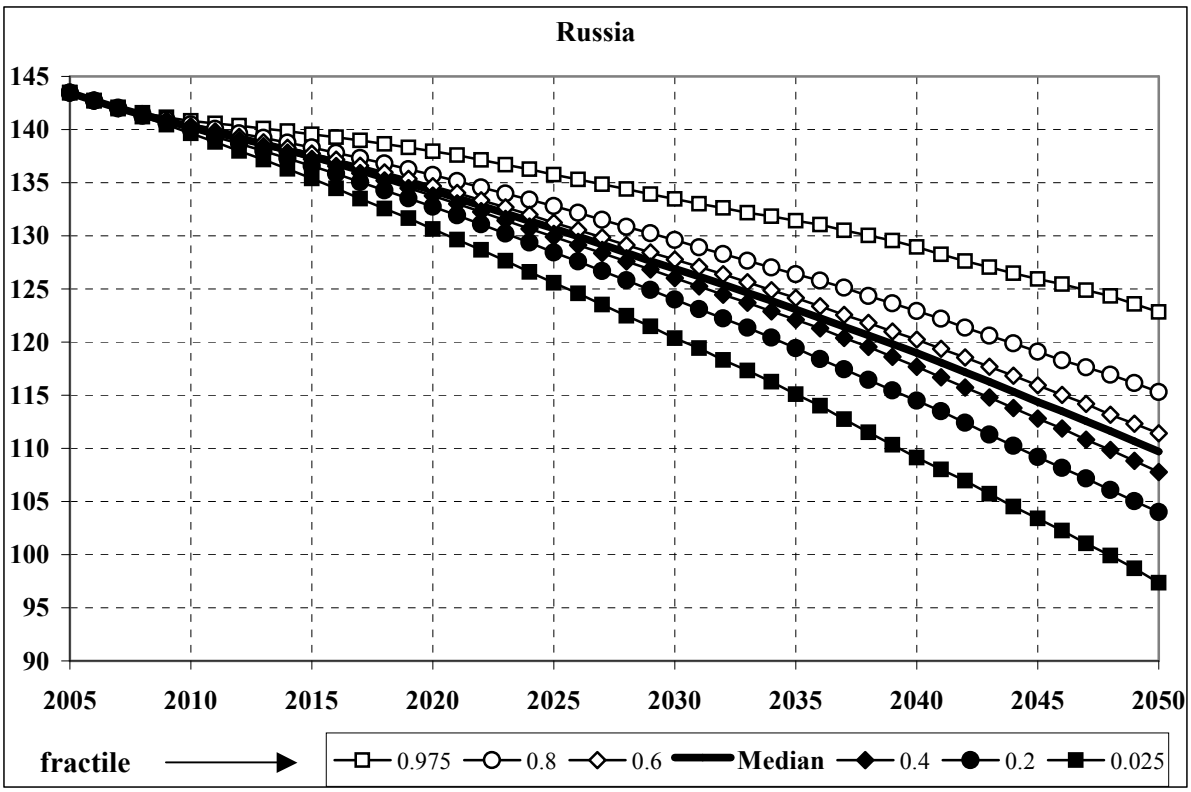
PROPORTION of (65+), %	**2005**		**2025**		**2050**	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
MALES						
60%-prediction interval	9.5	11.7	12.8-13.6	12.8-13.8	19.7-23.1	19.5-23.4
95%-prediction interval			12.2-14.2	12.2-14.4	17.4-25.6	17.5-26.6
FEMALES						
60%-prediction interval	17.4	19.6	21.0-21.8	21.7-23.0	28.5-31.6	28.7-32.7
95%-prediction interval			20.4-22.4	21.0-23.9	26.5-33.8	26.3-36.5
MALES AND FEMALES						
60%-prediction interval	13.7	15.9	17.2-18.1	17.7-18.8	24.4-27.7	24.4-28.4
95%-prediction interval			16.6-18.6	17.0-19.5	22.4-30.0	22.4-31.7
MEDIAN						
males	***9.5***	***11.7***	***13.3***	***13.2***	***21.4***	***21.5***
females	***17.4***	***19.6***	***21.4***	***22.4***	***30.0***	***30.4***
males and females	***13.7***	***15.9***	***17.7***	***18.2***	***26.0***	***26.3***

PROPORTION OF 80+, %	**2005**		**2025**		**2050**	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
MALES						
60%-prediction interval	0.8	1.2	1.6-1.8	1.8-2.1	3.7-4.8	3.3-4.5
95%-prediction interval			1.5-1.9	1.7-2.2	3.0-5.8	2.8-5.7
FEMALES						
60%-prediction interval	3.0	3.7	3.8-4.2	4.9-5.4	7.1-8.6	7.3-9.1
95%-prediction interval			3.6-4.4	4.6-5.7	6-2-9.8	6.4-10.8
MALES AND FEMALES						
60%-prediction interval	2.0	2.5	2.8-3.1	3.5-3.9	5.5-6.8	5.5-7.0
95%-prediction interval			2.7-3.2	3.3-4.1	4.7-7.9	4.8-8.3
MEDIAN						
males	***0.8***	***1.2***	***1.7***	***2.0***	***4.2***	***3.9***
females	***3.0***	***3.7***	***4.0***	***5.1***	***7.8***	***8.1***
males and females	***2.0***	***2.5***	***2.9***	***3.7***	***6.2***	***6.2***

OLD AGE DEPENDENCY RATIO	**2005**		**2025**		**2050**	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
60%-prediction interval	19.3	23.0	25.2-26.4	25.8-27.6	39.6-45.5	39.5-47.2
95%-prediction interval			24.4-27.2	24.8-28.7	36.2-50.2	35.6-54.3
MEDIAN			25.8	26.7	42.5	43.0

MEDIAN AGE	**2005**		**2025**		**2050**	
	RUSSIA	**UKRAINE**	**RUSSIA**	**UKRAINE**	**RUSSIA**	**UKRAINE**
MALES						
60%-prediction interval	34.2	35.3	39.6-40.4	39.7-40.7	42.9-46.8	43.2-47.7
95%-prediction interval			39.0-41.0	39.1-41.3	40.2-49.4	40.5-51.4
FEMALES						
60%-prediction interval	40.3	41.6	44.6-45-4	45.3-46.4	49.8-53.8	50.7-55.0
95%-prediction interval			44.0-45.9	44.6-47.3	46.8-55.9	47.6-58.1
MALES AND FEMALES						
60%-prediction interval	37.3	38.7	42.0-42.8	42.4-43.5	46.2-50.4	46.8-51.7
95%-prediction interval			41.5-43.4	41.8-44.2	43.4-52.8	44.1-55.1
MEDIAN						
males	***34.2***	***35.3***	***40.0***	***40.2***	***44.9***	***45.5***
females	***40.3***	***41.6***	***45.0***	***45.9***	***51.9***	***52.8***
males and females	***37.3***	***38.7***	***42.4***	***43.0***	***48.3***	***49.2***

Fig.1. Projected total population size, Russia and Ukraine (mln)



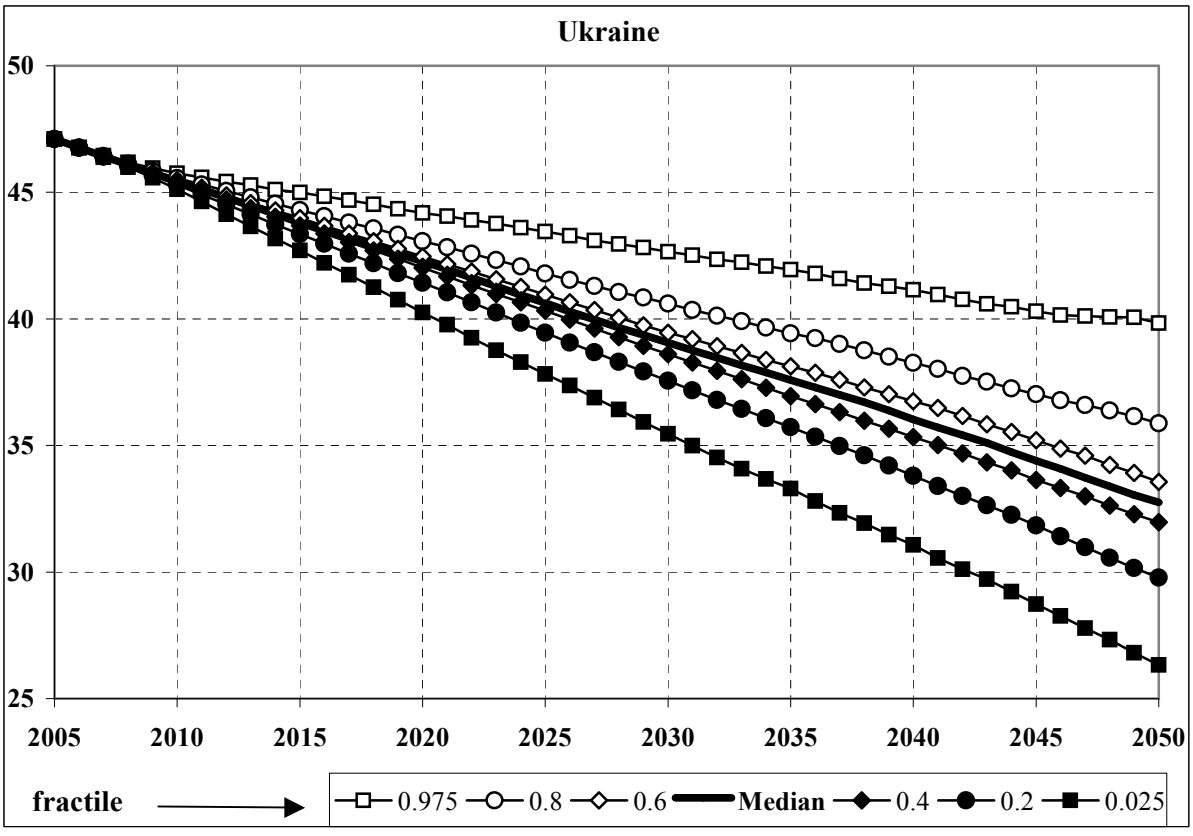
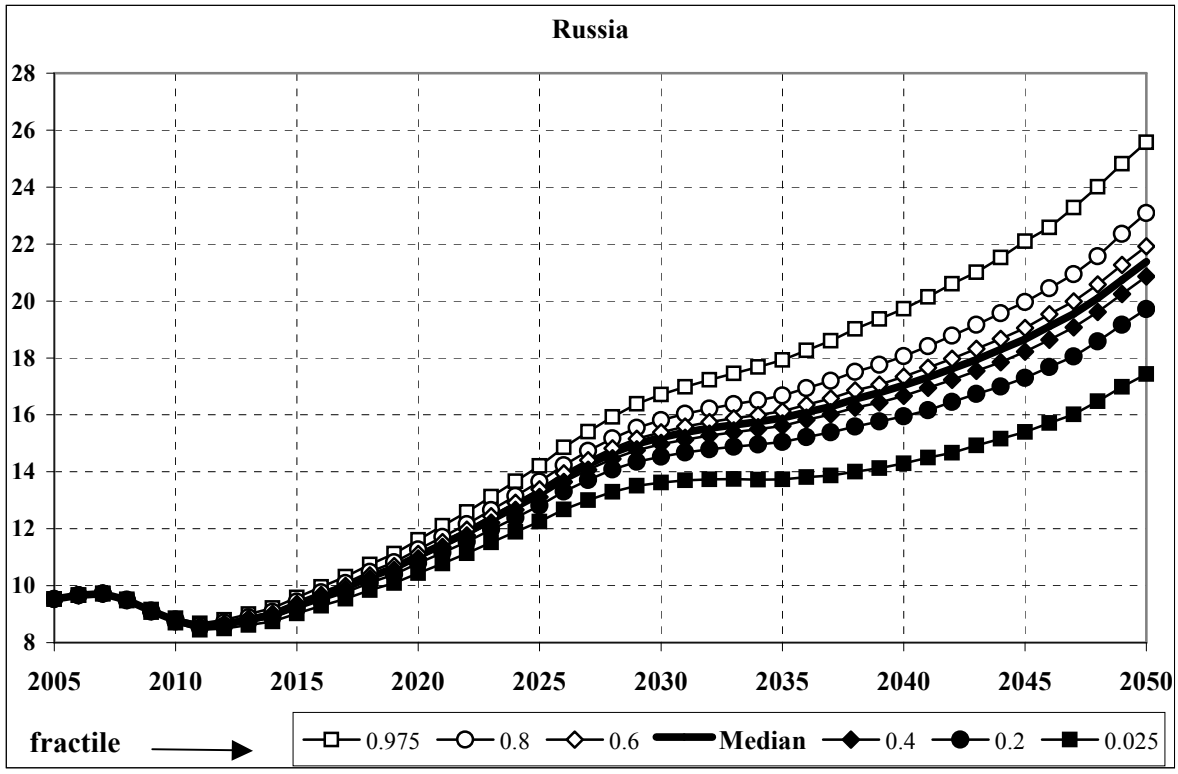


Fig.2. Forecasted proportions of 65+ for males, Russia and Ukraine (%)



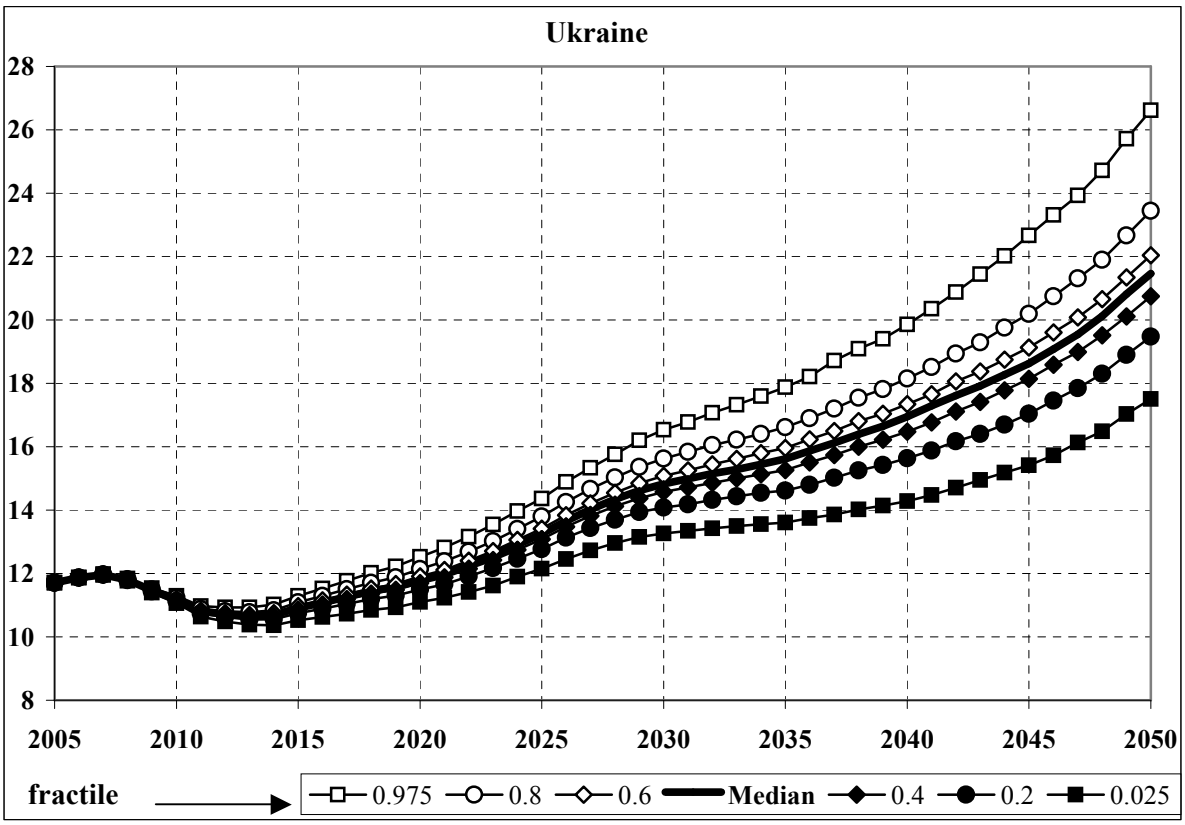


Fig.3. Forecasted proportions of 65+ for females, Russia and Ukraine (%)

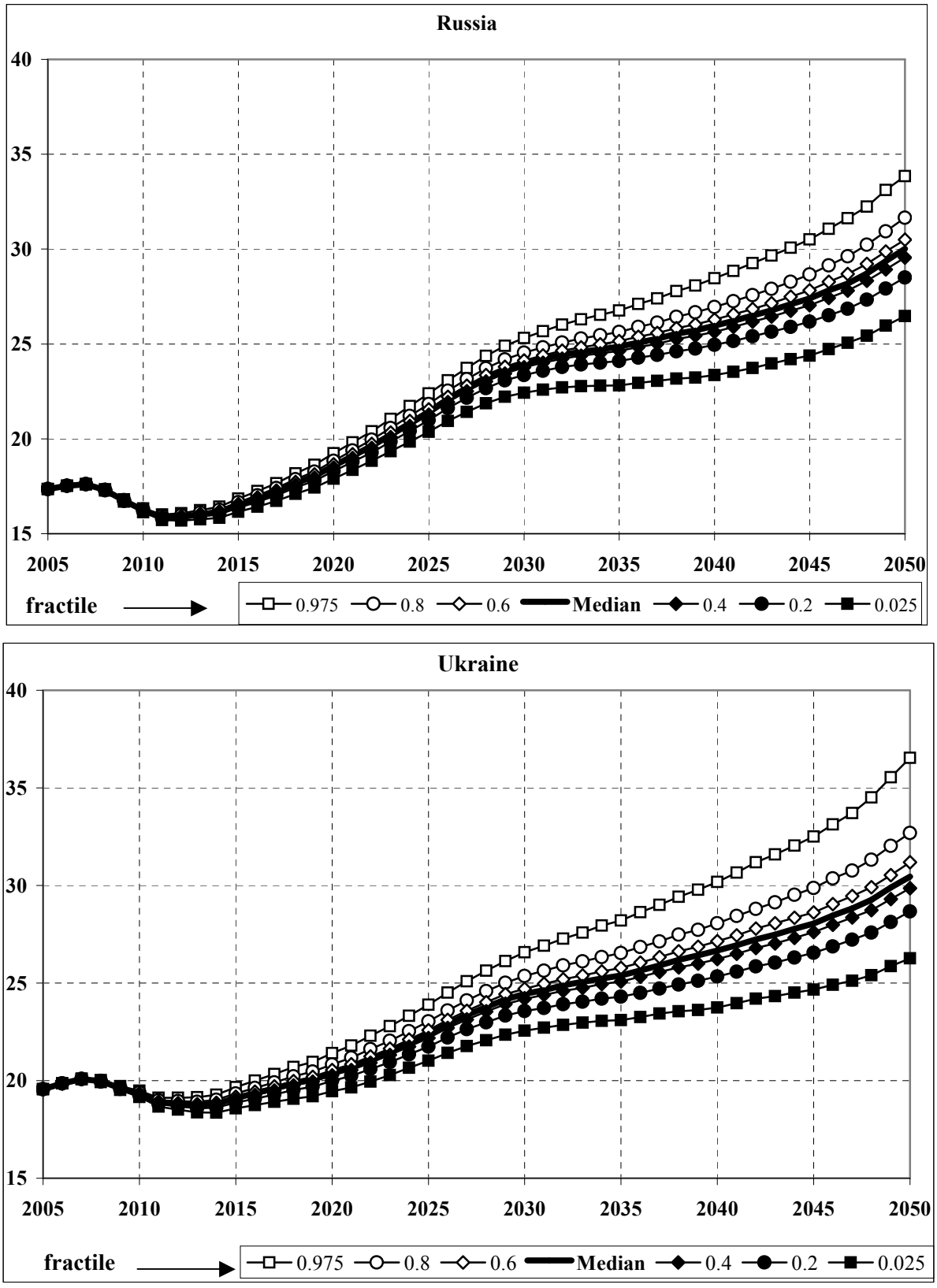
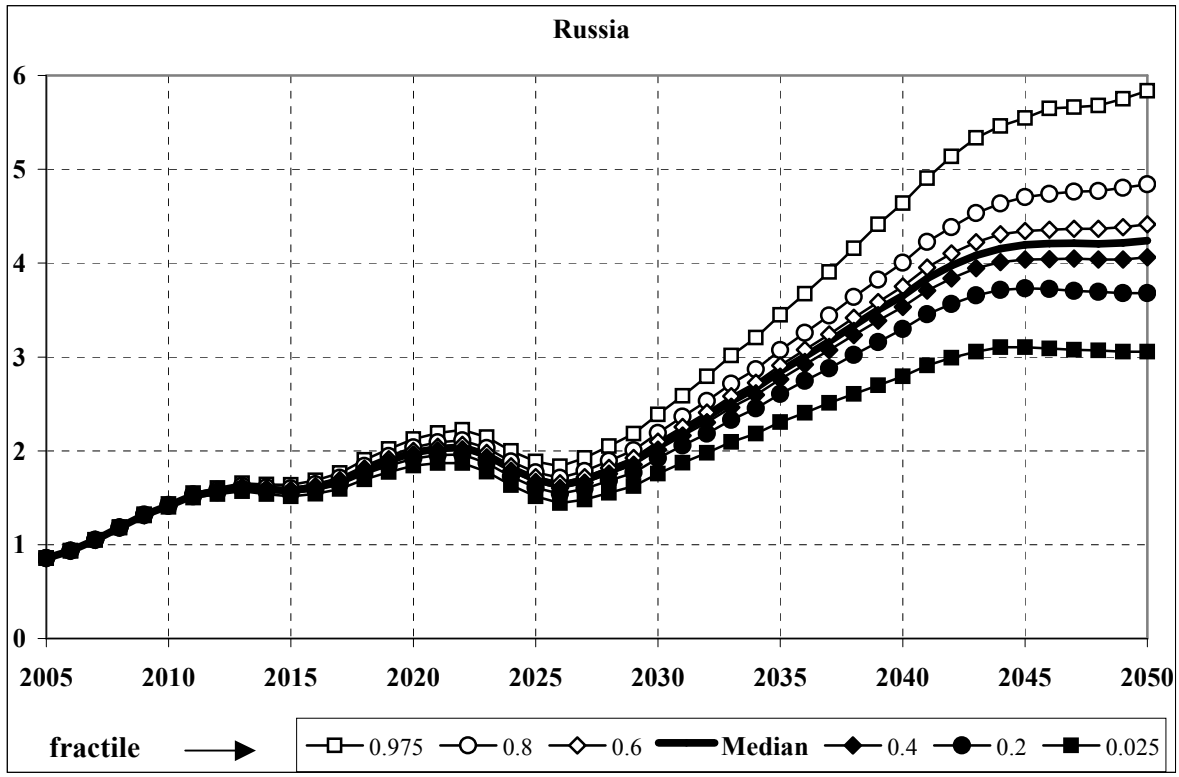


Fig.4. Forecasted proportions of 80+ for males, Russia and Ukraine (%)



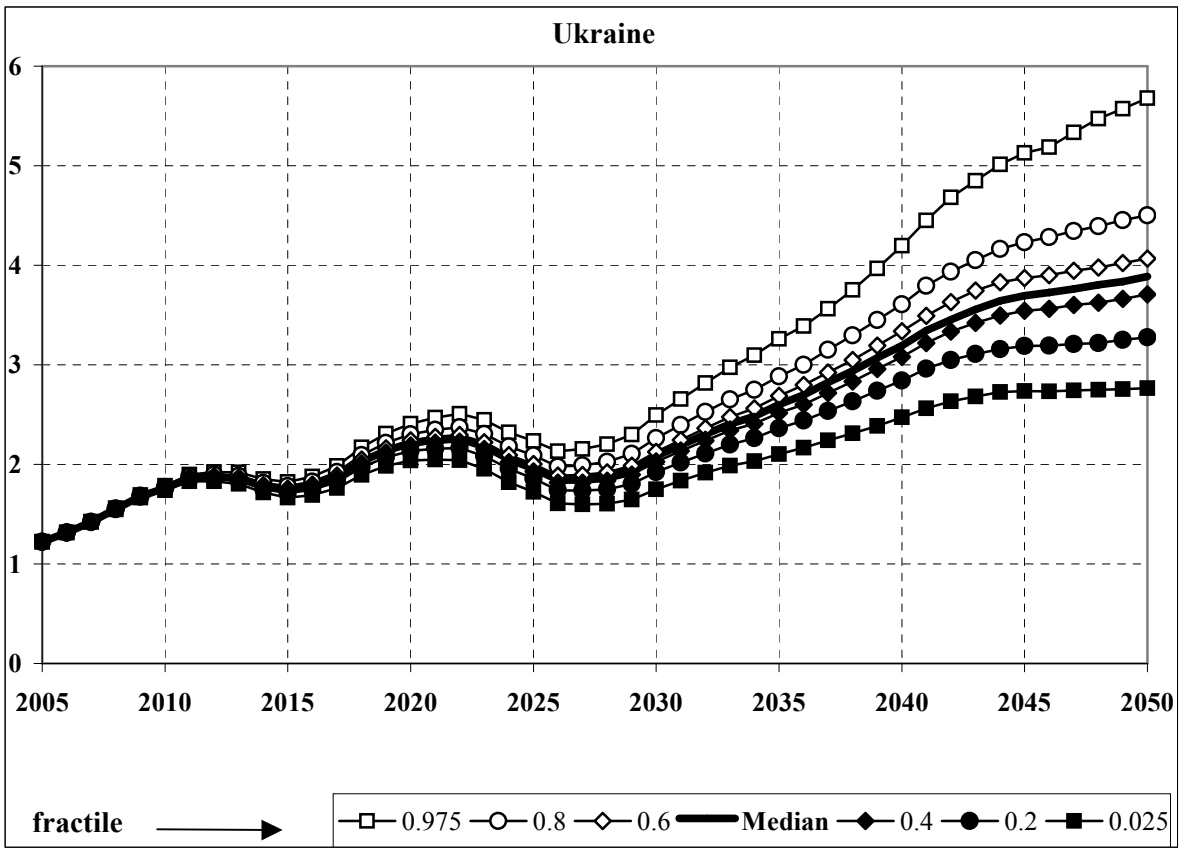
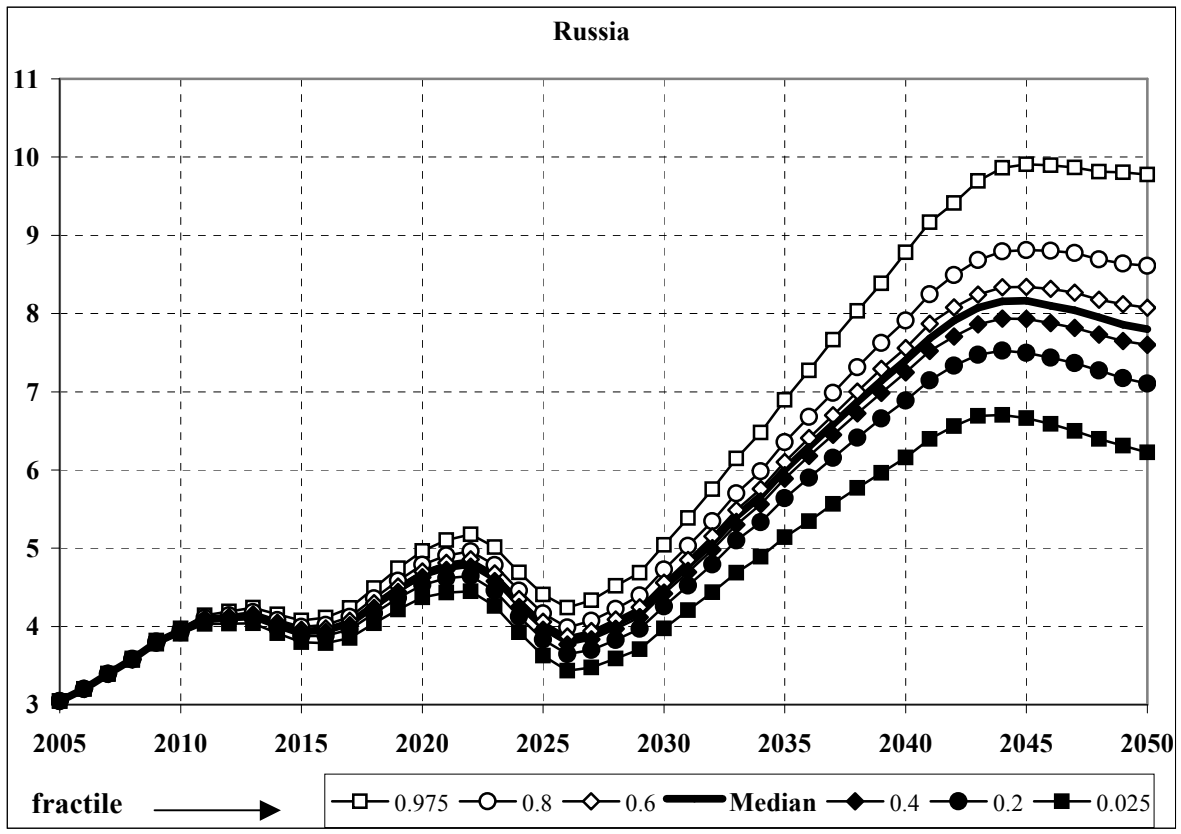


Fig.5. Forecasted proportions of 65+ for males, Russia and Ukraine (%)



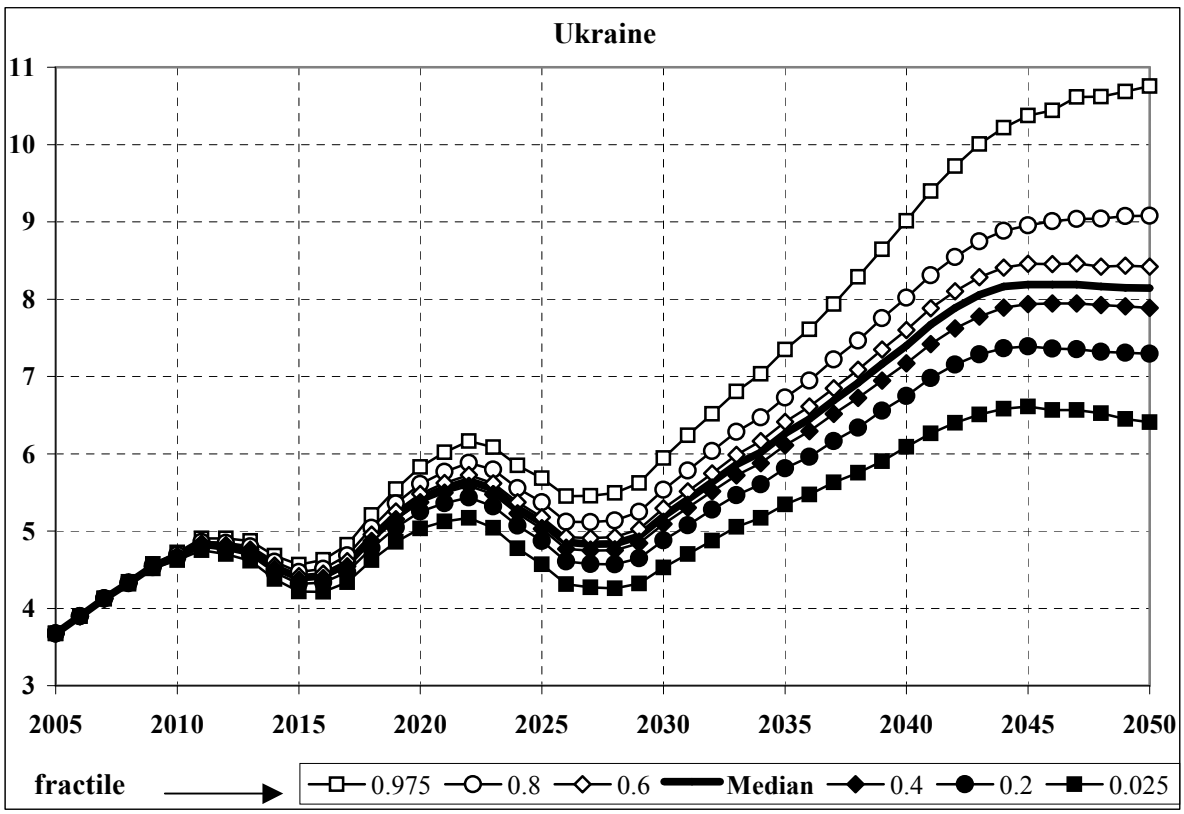


Fig.6. Forecasted old-age dependency rates for Russia and Ukraine

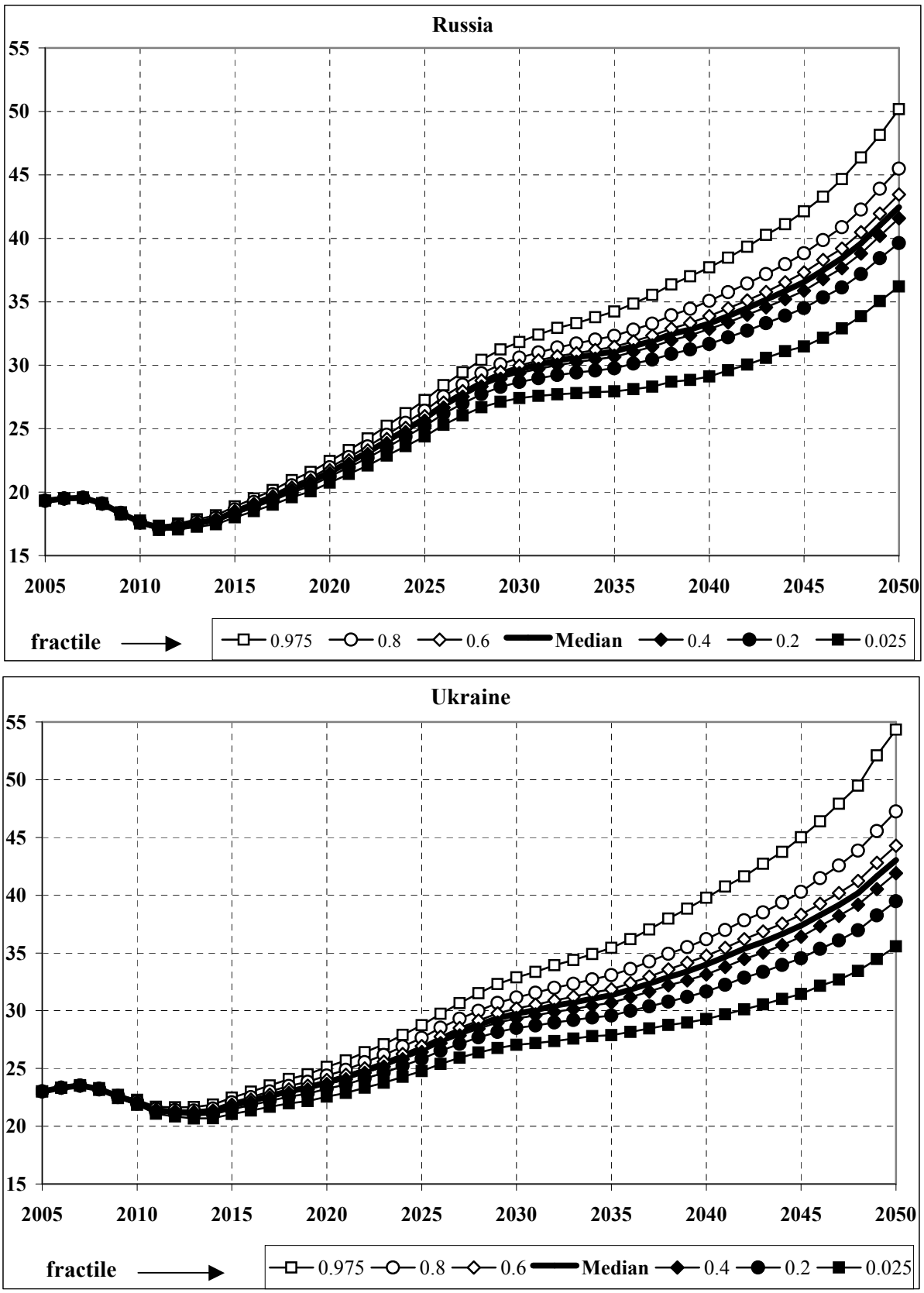


Fig.7. Median age for males, Russia and Ukraine

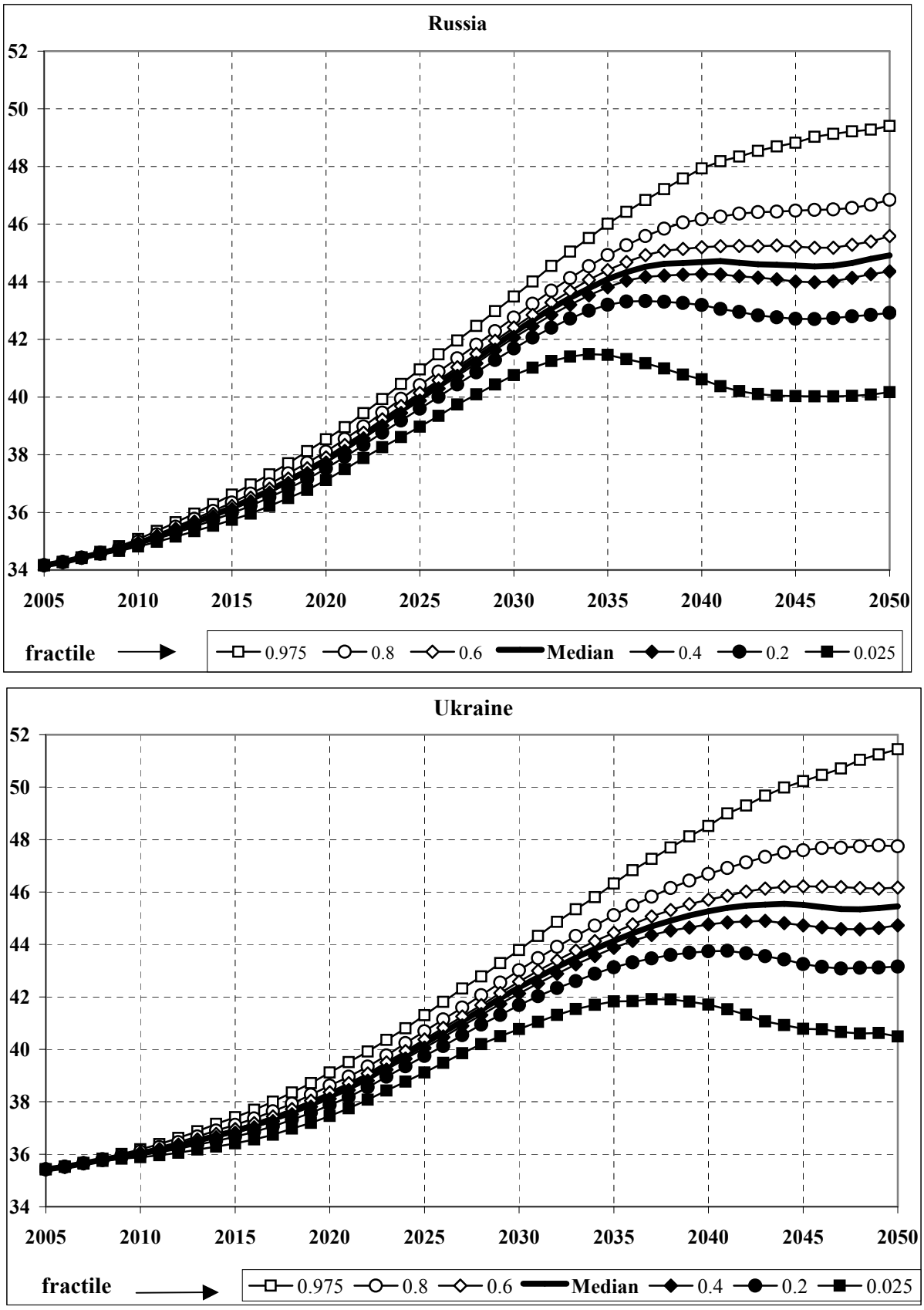
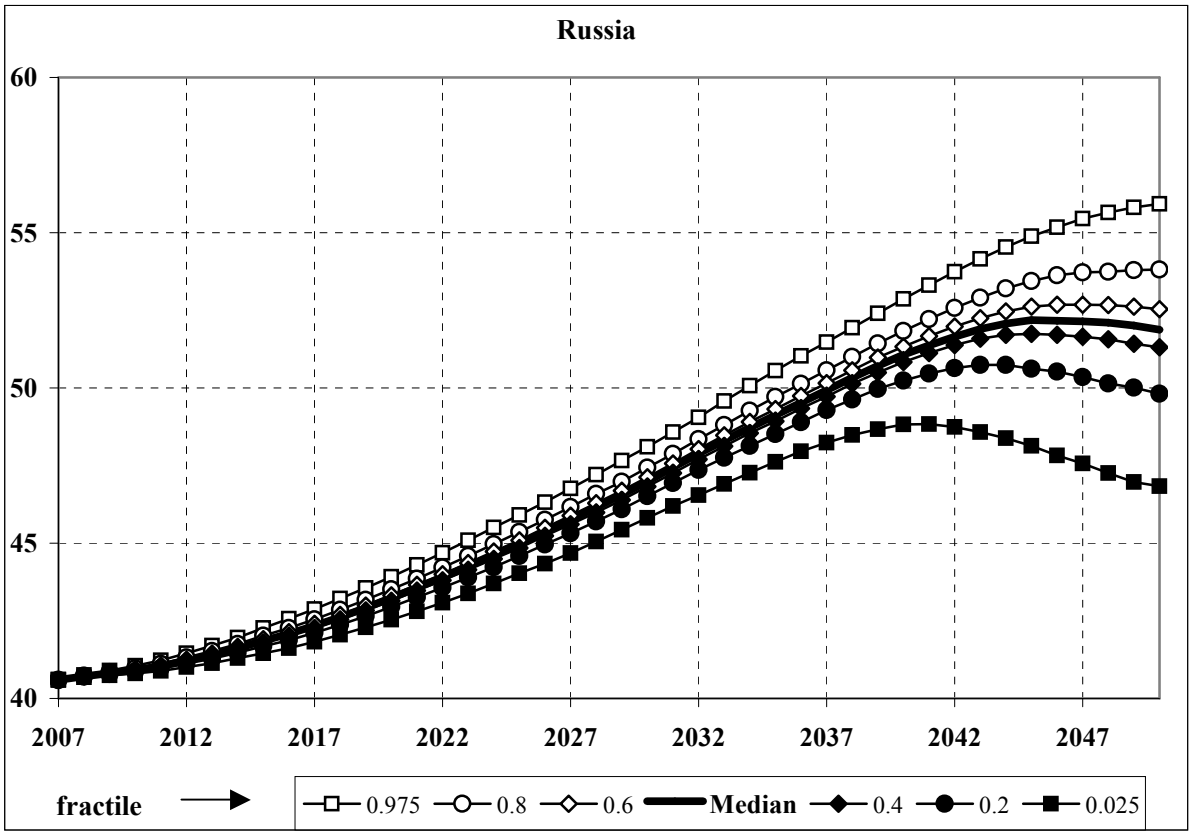
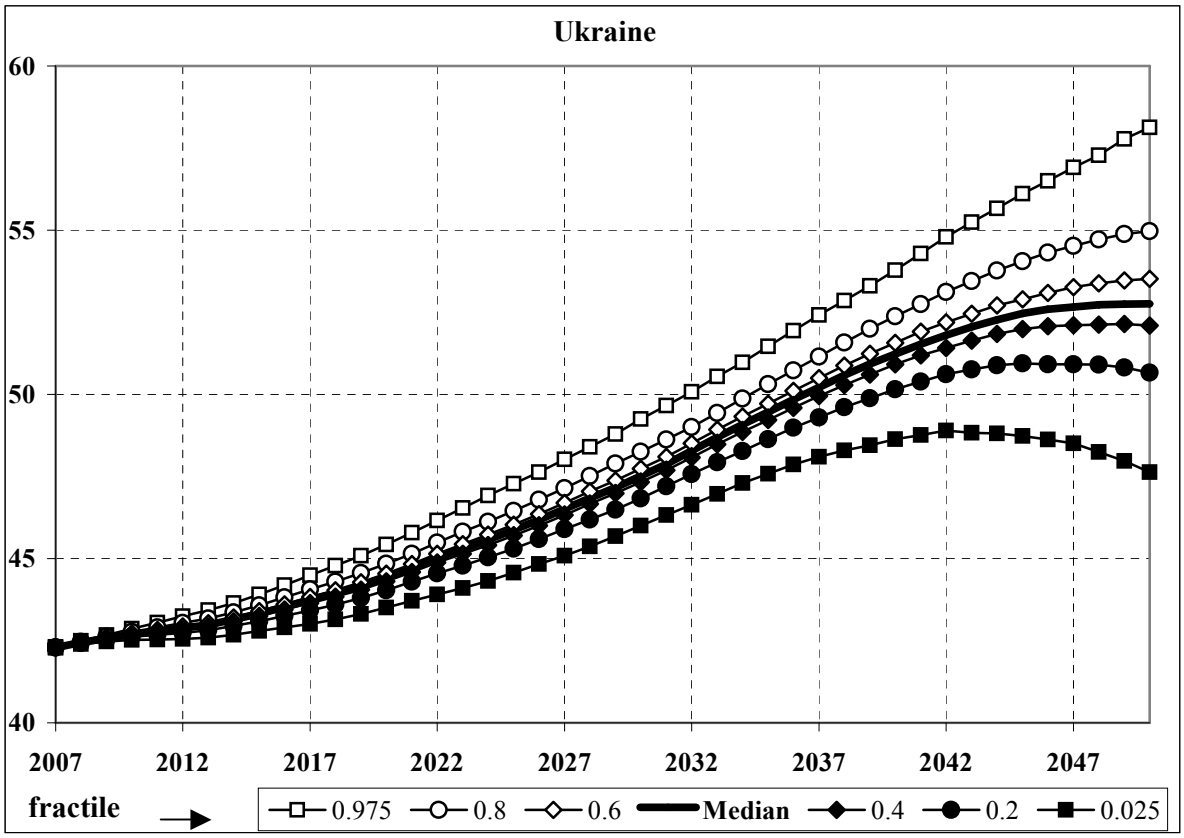


Fig.8. Median age for females, Russia and Ukraine





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