Chapter 12

Russia's Population Crises in the 1990 s and the Long Run[1] : How can we dream with Russia ?

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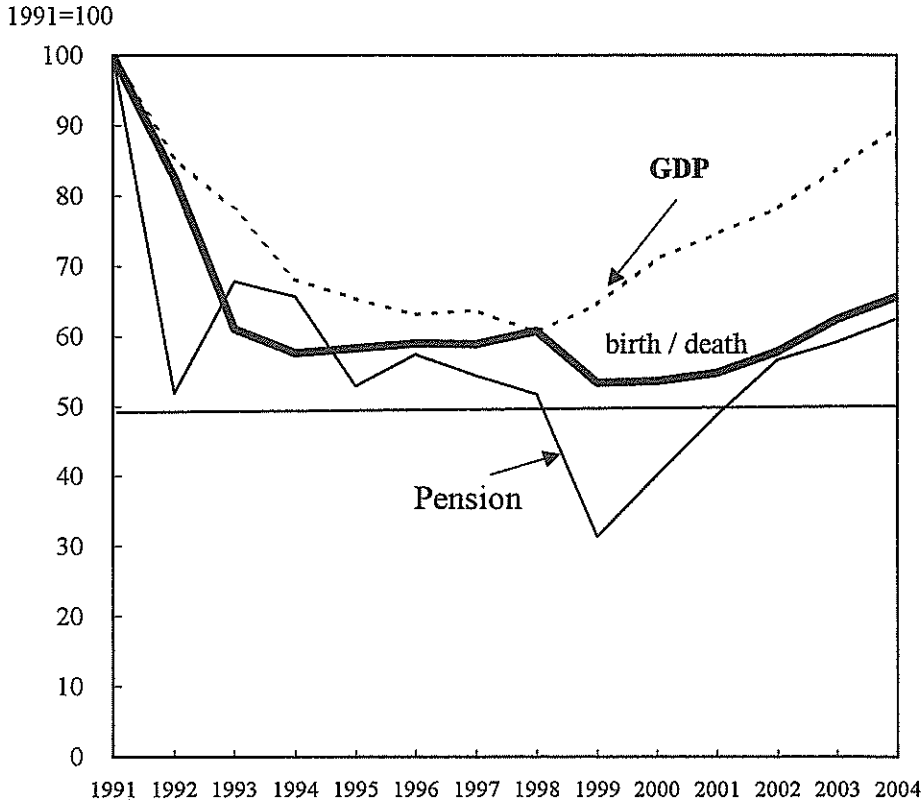
12.1 Introduction

During the 1990 s the breakup of the Soviet path dependency contributed to the shift towards democracy and freedom and helped solve chronic shortages in Russia. However, it may be said that these particularly severe ten years (the 1990 s) added to the hardship which the Russian Federation has been experiencing over the long run.

Figure 12.1[2] clearly shows that, under hyperinflation of the period, the sudden drop in the *birth-death ratio*[3], as well as the fall in real average monthly pension exceeded the drop in the real GDP. Against the background of worsening high inflation and a deepening production crisis, the population and pension crisis also became clear. Although signs pointed to a recovery of pension, corresponding to marked improvements in the GDP from 1999 (annual growth rates in 1999, 2000, 2001, 2002, 2003, 2004 and 2005 were 5.4%, 9%, 5%, 4.7%, 7.3%, 7.1% and 6.4% respectively), the pension level was only 50% of the 1991 level in 2000 and 2001 and approximately 60% in 2004. The birth-death ratio showed slight improvements for three years after 1994, but reverted back to a decreasing trend after the Financial Crisis in August 1998. In 2001, the birth-death ratio showed signs of recovery again, but it was just over half (55%) of the 1991

Figure 12.1 Russia's Crisis in the 1990s and its Recent Recovery



level. Then the birth-death ratio showed further improvements and reached 66% of the 1991 level in 2004. However, this trend may not be so sustainable, considering 63% of the 1991 level in 2005 (*SEP*, No. 1, 2006). Undoubtedly, the recovery of population and pension has been much slower than that of GDP in Russia.

The main purpose of this chapter develops further the statistical analysis of Russia's population crises in the 1990 s and in the long run in order to determine the outlook for the intergenerational equity trend, as well as the population trend in the first half of the 21st century in Russia.

This chapter examines the Russian population crisis in the 1990 s and demographic paths to 2050 in view of international comparisons, based on data of the Russian Statistics Office (*Rosstat*, former *Goskomstat*) and the United Nations. First, it is shown that subsequent population drops in Russia for 1993-2050 can be expected. It is clarified that the population crisis in the 1990 s made the beginning

Table 12.1 Top Ten Countries Whose Population is Projected to Decrease Between 2000 and 2050 (medium variant)
(ranked by 2000 revision)

Rank Order	Population (*thousands*)		Difference	
	2000	2050	Absolute (*thousands*)	Percentage
1 Russia	145,491	104,258	−41,233	−28
2004 rev	146,560	111,752	−34,808	−24
2 Ukraine	49,568	29,959	−19,609	−40
2004 rev	49,116	26,393	−22,723	−46
3 Japan	127,096	109,220	−17,876	−14
2004 rev	127,034	112,198	−14,836	−12
4 Italy	57,530	42,962	−14,568	−25
2004 rev	57,715	50,912	−6,803	−12
5 Germany	82,017	70,805	−11,212	−14
2004 rev	82,344	78,765	−3,579	−4
6 Spain	39,910	31,282	−8,629	−22
2004 rev	40,717	42,541	1,824	4
7 Poland	38,605	33,370	−5,235	−14
2004 rev	38,649	31,916	−6,733	−17
8 Romania	22,438	18,150	−4,288	−19
2004 rev	22,117	16,757	−5,360	−24
9 Bulgaria	7,949	4,531	−3,419	−43
2004 rev	7,997	5,065	−2,932	−37
10 Hungary	9,968	7,486	−2,481	−25
2004 rev	10,226	8,262	−1,964	−19

Sources : http://www/un.org/esa/population/publications/wpp2000/wpp2000at.xls (Table 15), and http://esa.un.org/unpp/ (December, 2005)

of the long run depopulation earlier and deeper. Then this chapter statistically verifies the population crisis in the 1990 s, and presents a new estimate of premature deaths or population loss due to the early transition. In addition, employing dependency ratios as a reference, the impacts of the 1990 s crisis on demographic and pension burdens in Russia are investigated. Finally, implications of demographic crises in Russia are preliminarily reappraised, particularly in relation with possibilities of its economic growth. How can we dream with Russia under the long run depopulation? This is a very interesting and important issue. Here we confine ourselves to point out the need to study further this problem.

12.2 Russia's population crisis in the long run

12.2.1 Pre-census estimates

Figure 12.3 (the fine broken line) shows population projections for Russia made by the United Nations 2000 revision (UN, 2001 a, b) (1950-2000 : recorded actual values ; 2001-2050 : estimations ; all are mid-year values). As can be seen from the figure, Russia's population gradually increased from 102.7 millions in 1950 and reached its peak of 148.8 millions in 1992. Then, Russia entered a long-term depopulation process. The population size in 2000 was estimated to be 145.5 millions. Based on the medium variant projections, the Russian total population was expected to fall to 133.3 millions in 2015 (the 1975 level) and reach 104.3 millions in 2050 (the 1950 level). What should be noted about the UN 2000 revision was that the 1998 (UN, 1999 a) medium variant projections (142.95 millions in 2015 and 121.3 millions in 2050) were revised downward by 10 to 20 millions.

The UN 2000 projections included shocking implications for Russia's future. In Table 12.1 based on medium variant projections, Russia was the top of 39 countries whose populations were expected to decline between 2000 and 2050. Russia's decrease during 2000-2050 in absolute terms was expected to be the largest, estimated at 41.2 millions. Ukraine, a former Soviet Union country, and four East European countries (Poland, Romania, Bulgaria and Hungary) were also highly ranked. Japan was predicted to follow Ukraine, with the expected loss of 17.9 millions. Although Japan was well known to face a future population crisis, it was suggested that the long run population crises in Russia and Ukraine were worse than in Japan. It was also shown that Bulgaria shared a marked future population problem.

Along with the United Nations, the Russian authorities recognized the long run population crisis of the country. Figure 12.2 (the fine solid line) and Table 12.2 presented mid-year population figures from 1989 to 2000 and pre-census estimates from 2002 to 2015, based on data of Rosstat (the Russian Statistics Office). According to these

data, Russia's total population peaked at 148.3 millions in 1992 and gradually declined to 145.2 millions in 2000. Following subsequent declines, the population was estimated to reach 135.2 millions in 2015, exceeding the UN high variant projection (134.6 millions). Such pre-census estimates were extended to 2050 by Rosstat which predicted the total population of 101.9 millions (end-year value) in 2050 (*O Vozmozhnykh*...2002). In contrast with the estimate for 2015, the Rosstat estimate for 2050 was much lower than the UN medium variant projection.

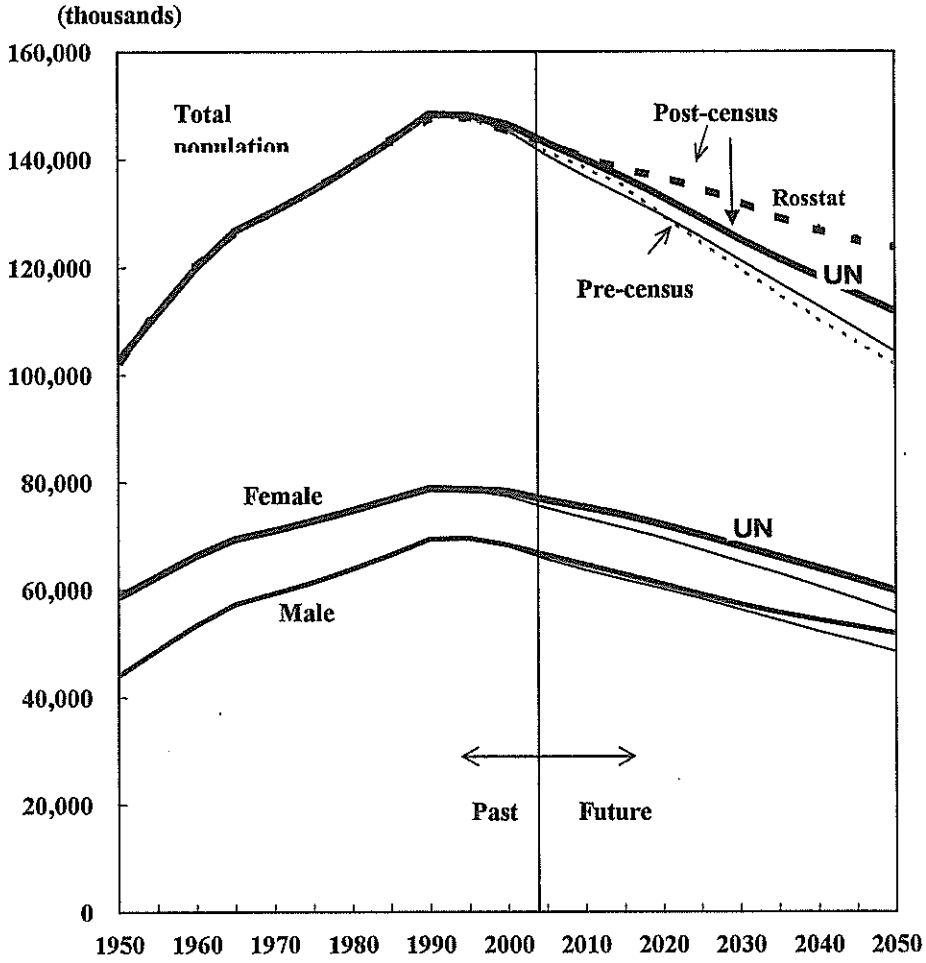
12.2.2 Post-census estimates : Upward revisions of the pre-census estimates

Rosstat made the nation-wide population census on October 9, 2002. This census clarified some problems of the past vital statistics, including a marked underestimation of population in Moscow city. In fact, the census data of population in Moscow city was higher than the vital population data as of January 1, 2002 by 1.8 millions (a 21% change). The Russian official data on total population time series were revised in a slightly upward direction because the census data of Russia's total population was very slightly higher than the vital population data as of January 1, 2002 by only 1.2 millions (a 0.85% change) (*RSE*, 2003, *Itogi*...2004). The United Nations also began to provide the 2004 revision based on recent changes in the source data after the 2000 revision. The new UN population prospect for Russia showed an upward revision (UN, 2005, http//esa.un.org./unpp).

The bold solid line in Figure 9.2 displays the UN 2004 revision data on the Russian total population (medium variant). As in the pre-census prospect, the new estimate on the population reaches its peak in 1992 and then enters into the long run depopulation process. According to the post-census prospect the population will drop to 137 millions (the 1978 level) in 2015 and to 118 millions in 2050 (the 1955 level). The UN 2004 annual projections of Russia's population revised the 2000 revision (medium variant) upwards by 3 to 7 millions.

As is shown in Table 12.1, Russia's total population change for 2000-2050 in the post-census UN prospects (2004 revision) is im-

Figure 12.2 Russian Population : 1950-2050



proved in comparison to 2000 revision by 6 millions (4% points). In contrast, Ukraine is prospected to be worse than before. Upward revisions for Germany and particularly Spain are remarkably large. Among East European countries Poland and Romania are prospected to be worsen, while Bulgaria and Hungary are estimated to be slightly better.

Rosstat also tried to revise its population prospect (medium variants) as is shown by the bold broken line in Figure 12.2 (data for 2006-2025 are from *Predpolozhitel'naia*...2005 and data for 2026-2050 are supplied by Rosstat). As can be seen by Table 12.2, Rosstat revised its old time series for 2005-2015 upwards by 1 to 2%. The new post-census population in 2015 is estimated to be 138 millions. The

Table 12.2 Demographic Trends in Russia : 1989-2050
Rosstat (Goskomstat) data

	Mid-year ; *total population in thousands*		
	pre-census	post-census	change (%)
1989	146,825	-	-
1990	147,913	147,970	0.04
1991	148,245	148,395	0.10
1992	148,310	148,539	0.15
1993	148,146	148,459	0.21
1994	147,968	148,408	0.30
1995	147,774	148,376	0.41
1996	147,373	148,161	0.53
1997	146,938	147,916	0.67
1998	146,534	147,671	0.78
1999	145,943	147,215	0.87
2000	145,189	146,597	0.97
2001	144,387	145,977	1.10
2002	143,526	145,307	1.24
2003	142,920	144,566	1.15
2004	142,241	143,821	1.11
2005	141,606	143,106	1.06
2006	140,991	142,496	1.07
2007	140,375	141,869	1.06
2008	139,766	141,283	1.09
2009	139,160	140,740	1.14
2010	138,536	140,232	1.22
2011	137,910	139,759	1.34
2012	137,269	139,319	1.49
2013	136,598	138,916	1.70
2014	135,913	138,545	1.94
2015	135,203	138,207	2.22
2016	-	137,899	-
2017	-	137,603	-
2018	-	137,306	-
2019	-	137,018	-
2020	-	136,724	-
2021	-	136,403	-
2022	-	136,042	-
2023	-	135,632	-
2024	-	135,179	-
2025	-	134,683	-
...	-	...	-
2050	101,920	123,551	21.22

Notes :
1. Calculated by *DER*, 2001, p. 31, *Predpolozhitel'naia*...2002, p. 27, 2005, p. 7, *RSE*, 2005, *SEP*, No. 1, 2006 and the total population for the years 2026-2050 supplied by Rosstat in May, 2005.
2. All estimates are medium variant values.
3. t mid-year value : = [t beginning year value+ (t+1) beginning year value]/2.

change from the old to new estimate for 2015 is slight ; only 3 millions (a 2% change). However, after 2015 the change shows a marked increase and the population in 2050 is prospected to be 124 millions which is much higher than before by 21%. Namely, Rosstat supposes a rather optimistic population prospect after the 2002 census in contrast to the old pessimistic estimate. It should be noted that the long run depopulation trend itself is shared with both old and new prospects. The old vital population data statistics is under preliminary revision after the census, while the upward revisions of the data for the 1990 s data and the first several years of the 2000 s remain very small ; by 0.1% to 0.9% for 1990 s and 1% to 1.2% for 2000-2005, based on data shown by http//www.gks.ru for the 1990 s and Table 9.2 for the 2000 s.

Here, it is sufficient to understand the following facts : (1) any prospect shows a marked depopulation trend after 1992 on wards ; (2) the difference medium variant prospects between UN and Rosstat gets greater after the census ; (3) we have little evidence to discuss the relative merits of estimates by UN and Rosstat.

By comparing the UN data with the Rosstat data, as are shown in Table 12.3, we can observe that the difference of total pre-census population prospects by UN and Rosstat was due to the large difference of prospects of female population. The post-census prospects do not show such a feature. The total 2015 population in the Rosstat post-census medium variant projection is higher than in the UN projection by 1.5 millions (1.8 millions in pre-census prospects). This can be said to be plausible. However, it is noted that the total 2050 population in the Rosstat post-census projection is much higher than in the UN projection by 11.8 millions,

Immigrants and emigrants to and from Russia also influence population dynamics. As for Russia, in the first half of the 1990 s after the collapse of the former Soviet Union, immigrants to Russia from former Soviet republics far exceeded emigrants moving out of Russia. The net-population migration in 1993, 1994 and 1995 were 430 thousands, 810 thousands and 500 thousands respectively. This drastic movement of the population contributed to relaxing the decrease in population during the same period (this also explains why the calculated cohort change rates between 1990 and 1995 exceed "1"). In the subsequent years, the net population migration decreased to 160

Table 12.3 Differences Between the Russian Official Estimate and the UN Projection
(mid-year, medium variant ; *thousands*)

		Rosstat (Goskomstat)	UN	Difference
2015 Pre-census	Total	135,203	133,314	1,889
	Male	62,064	61,881	183
	Female	73,139	71,433	1,706
2015 Post-census	Total	138,207	136,696	1,511
	Male	63,499	62,867	632
	Female	74,708	73,829	879
2050 Post-census	Total	123,551	111,752	11,799
	Male	56,140	51,903	4,237
	Female	67,412	59,849	7,563

Sources : *Predpolozhitel'naia...*, 2001, 2005, UN, 2001 a, http://esa.un.org/unpp/(December, 2005), and data supplied by Rosstat.

thousands in 1999, 210 thousands in 2000 and 70 thousands in 2001 (Sorokina, 2002). Recent net migration accounted for 35 thousands in 2003 and 39 thousands in 2004 (*SEP*, No 1, 2005). It was generally agreed that much net migration would not be expected in the subsequent years. The pre-census medium variant projection by Rosstat expected annual net migration of approximately 100 thousands for 2005-2015 (*Predpolozhitel'naia...*2002). However, the post-census projection by Rosstat assumes 300 thousands p. a. in 2015 and 380 thousands in p. a. 2025 (the author's calculations based on *Predpolozhitel'naia...*2005). This is a remarkably upward revision.

In contrast, both 2000 and 2004 revisions by the United Nations expect annual net migration to be only 50 thousands (UN, 2001 a, p. 388 and http : //esa.un.org/unpp, December 2005). Therefore, it can be stated that one of the main reasons regarding the large difference between post-census population prospects by UN and Rosstat is the marked difference between assumptions of net migration.

As was shown, the population decline in Russia began in the 1990 s, and a massive decline is expected in the long run even for the most optimistic medium variant projection by Rosstat. We believe that the population crisis in the 1990 s, which we will discuss in the next section, made the start of the long run population crisis earlier

Table 12.4 Distribution of the Population by Age : Russia (mid-year)

(*thousands*)

	1990			1995			2000		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total Population	147,913	69,266	78,647	147,774	69,387	78,386	145,189	67,990	77,199
Age Group									
0-4	11,515	5,877	5,638	7,889	4,048	3,840	6,357	3,263	3,094
5-9	11,691	5,941	5,751	11,651	5,949	5,703	7,952	4,078	3,874
10-14	10,755	5,456	5,299	11,822	6,007	5,815	11,727	5,983	5,744
15-19	10,185	5,180	5,005	10,829	5,494	5,336	11,858	6,016	5,842
20-24	9,525	4,880	4,645	10,242	5,255	4,987	10,794	5,446	5,347
25-29	11,724	5,955	5,769	9,518	4,873	4,645	10,263	5,241	5,023
30-34	12,951	6,522	6,429	11,688	5,886	5,802	9,490	4,819	4,671
35-39	12,023	5,994	6,030	12,830	6,381	6,449	11,555	5,746	5,809
40-44	9,653	4,754	4,900	11,799	5,785	6,014	12,553	6,133	6,420
45-49	6,128	2,919	3,208	9,346	4,500	4,846	11,391	5,444	5,948
50-54	10,421	4,828	5,593	5,800	2,668	3,132	8,875	4,125	4,751
55-59	7,714	3,433	4,281	9,708	4,297	5,412	5,371	2,344	3,027
60-64	8,789	3,580	5,208	6,954	2,910	4,044	8,761	3,626	5,135
65-69	5,292	1,632	3,661	7,619	2,859	4,759	5,970	2,284	3,686
70-74	3,317	933	2,384	4,357	1,210	3,148	6,149	2,059	4,090
75-79	3,397	832	2,564	2,450	609	1,841	3,228	788	2,441
80-84	1,871	392	1,480	2,106	448	1,658	1,523	332	1,191
84-89	749	127	623	881	161	719	993	189	804
90-94	167	25	142	250	41	210	287	54	233
95-99	34	5	29	29	6	23	76	17	59
100 or over	11	1	10	7	2	5	17	5	11
male & female									
0-15	36,045	18,330	17,716	33,575	17,128	16,448	28,466	14,560	13,906
male 16-59									
female 16-54	83,959	43,409	40,550	84,134	44,014	40,120	86,692	44,077	42,615
male 60+									
female 55+	27,909	7,527	20,381	30,064	8,246	21,819	30,031	9,353	20,677

Note : Estimated by the author using the data supplied by Rosstat (Goskomstat).

and deeper.

Table 12.4, based on the data provided by Rosstat, shows 1990, 1995, and 2000 mid-year population estimates by age and sex. Here, let us employ these 1990-2000 mid-year estimates as the base-data for estimating *premature* deaths. It is worth mentioning several features or flaws of population statistics by Rosstat (Goskomstat). First, except for the national census data, only the beginning-year (January 1 st) population figures have been released. The persons-years lived or mid-year values, which should be the source for death rate etc. calculations, have not been released. Second, the released time series by age and sex group have the following three problematic characteristics : (1) all those people who are 85 or over are put in a single age group, (2) (beginning-year) sex and age group data were not fully prepared for years prior to 1992, (3) since population of 15 years old is not shown separately, 1-15 age population and 16-59 age population cannot be read directly. (As for the data in the tables of this chapter, we can derive the 15 year old male and female population by subtracting the 0-14 population from the 0-15 population). Third, post-war population census data were limited to national census data of the former Soviet Union for 1959, 1970, 1979, and 1989 before the 2002 census for Russia. The first national census of the new Russia was held in October, 2002, and the results were made public just recently.

12.3 Russia's population crisis in the 1990s

12.3.1 Average life expectancy

Differing from both developed and developing countries, Russia's average life expectancy at birth has stagnated at a low level since 1959. Already many researchers have pointed out that the marked decrease in the average life expectancy, particularly in the male average life expectancy, during the 1990 s is a direct evidence of the Russian mortality crisis (Bennett *et al.*, 1998, Becker and Bloom, 1998 and Shkolnikov *et al*, 1998). In other words, the sufficiently short average life expectancy became much shorter during the 1990 s.

Figure 12.3 Average Life-expectancy in Russia : 1970-2015 (Rosstat pre-census data)

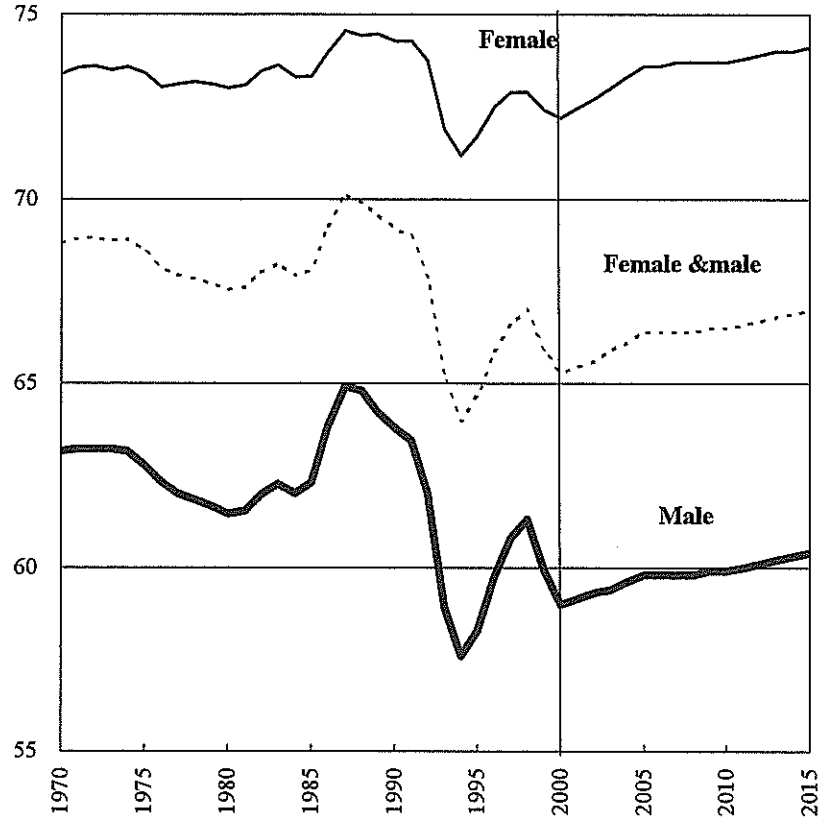


Figure 12.3[4] indicates the changes in Russian average male and female life expectancy (actual figures for 1970-2001 and pre-census medium variant projections by Rosstat for 2002-2015).

Male average life expectancy gradually declined from 63.2 yrs in 1970 to 61.5 yrs in 1980. The declining trend remained for a short while after 1980, but we can see a sharp and temporary increase during the Gorbachev period (64.9 yrs in 1987, 64.8 yrs in 1988, and 64.21 yrs in 1989.). However, this was followed by a declining trend, and during the early transition period the average life expectancy fell drastically from 62.0 yrs in 1992 to 58.9 yrs in 1993, and to 57.6 yrs in 1994. For two subsequent years it remained under 60 yrs. Although we can observe a slight increase to 60.8 yrs in 1997 and to 61.3 yrs in 1998, the situation deteriorated, and average life expectancy fell from 59.9 yrs in 1999 to 59 yrs in 2000. The improvement of average life expectancy in the Gorbachev period is thought to be

largely due to the policy of reducing alcohol consumption through legal restrictions. (The law of these restrictions was repealed due to the marked decrease in the alcohol tax revenue (the most important sin-tax) leading to the increasing financial deficit). The decline in 1993 and 1994 can be explained by the hard living conditions caused by hyper-inflation, increasing social instability and growing alcohol consumption (increasing circulatory system diseases, alcoholism, suicide and homicide) associated with the transition. Though there is no doubt that the August 1998 financial crisis contributed to the decline in 1999 and 2000, further research needs to be done in this area (See Gaidar, 2005, Ch. 10).

According to both the old and new medium estimates by Rosstat, male life expectancy will show little improvement in the future. As we will see later, the difference of the pre-census estimates of male life expectancy between UN and Rosstat was rather large, while that of the post-census estimates became small. The pre-census projection by Rosstat estimated the male average life expectancy to be 59.8 yrs in 2005 and 60.4 yrs in 2015, followed by a gradual rise. However, Rosstat assumed that the male life expectancy would still only increase to a maximum of 66.3 yrs in 2050. It is noted that in the post-census projection Rosstat made a slight upward revision for male life expectancy by 0.3 year from 2010 to 2025, while it made a slight downward revision for female life expectancy by 0.3 to 0.8 year from 2005 to 2025.

Although the Russian female average life expectancy has hovered around the level of 73.5 yrs since 1970, like male average life expectancy, it showed some improvement for a short of time during the Gorbachev period. It was followed by a drastic decrease for 1993-1995, and again during 1999-2000. The range of change in the female average life expectancy was smaller than that in the male average life expectancy. The Rosstat pre-census medium variant projections were rather pessimistic regarding the improvement in female average life expectancy in the future (74.1 yrs in 2015 and 77.7 yrs in 2050).

The large difference between male and female average life expectancy (gender differential) highly characterizes the Russian population crisis (Becker and Bloom, 1998, p. 1914). This gender differential was on a relatively high level in the light of an international compar-

ison, 10.2 yrs in 1970, 11.6 yrs in 1980, and 10.5 yrs in 1990, which was followed by a sudden increase, and it showed an increase to the highest level in the world, 13 yrs in 1993, 11.6 yrs in 1994, and 13.4 yrs in 1995. Though the differential thereafter slightly decreased, it increased again and reached 12.5 yrs in 1999 and 13.2 yrs in 2000.

Rosstat forecasted the pre-census medium gender differential to stay at a high level (13.8 yrs in 2005, 13.7 yrs in 2015), followed by a gradual decrease before stabilizing at 11.4 yrs in 2050 (the 1978-1984 level).

Table 12.5 indicates an international comparison of male average life expectancy based on the UN pre-census medium variant projections. It shows that Russia had the largest decrease in average life expectancy for 1985-1990 and 1990-1995 (a 6% decrease), followed by Ukraine, Kazakhstan, Latvia, Estonia, and Latvia (all with a 5% decrease). Kazakhstan, located in Central Asia, had a male average life expectancy lower than Russia, at 63.6 yrs in the second half of the 1980 s, 60.5 yrs in the first half of the 1990 s, and 58.6 yrs in the second half of the 1990 s. During the entire 1990 s, the decrease in male average life expectancy was much greater in Kazakhstan than in Russia (Russia with a 7% decrease, and Kazakhstan with an 8%). The male average life expectancy in former Soviet republics, excluding the Caucasian countries, was rather short.

The UN pre-census medium variant projections suggested that the male average life expectancy in Russia as well as in other countries will see some considerable improvement after 2010-2015. The male average life expectancy during 2045-2050 in Russia and Kazakhstan was expected to reach 73 yrs and 73.1 yrs. Although these are the shortest in the table, they are still far longer than the Rosstat pre-census estimation. In the post-census projections UN made a marked downward revision for Russia's male life expectancy ; 59.6 yrs for 2010-2015 and 68.9 yrs for 2045-2050. This is also relevant for Kazakhstan ; 61.3 for 2010-2015 and 69.1 for 2045-2050

Table 12.6 shows the life expectancy gender differential through the UN pre-census medium variant projections. Russia's gender differential averaged 10 yrs through 1985-1990, 12.3 yrs through 1990-1995, and 12.3 yrs through 1995-2000. Regardless of the period until 2015 Russia had the largest gender differential. Other countries such as Belarus (1990-1995 : 10.4 yrs, 1995-2000 : 11.6 yrs), Ukraine

Table 12.5 Average Male Life Expectancy by Country
(*pre-census* ; *age*)

	1985-1990	1990-1995	1995-2000	2010-2015	2045-2050
European Average	69.2	68.5	69.1	72.2	77.7
East European Average	65.6	63.0	63.0	66.7	74.3
Belarus	66.6	64.5	62.8	66.3	74.4
Bulgaria	68.3	67.7	67.1	68.9	75.3
Czech	67.8	68.8	70.9	74.3	78.4
Hungary	65.5	64.8	66.3	70.2	76.1
Poland	66.9	67.0	68.6	72.0	76.9
Moldova	64.1	63.6	62.8	66.8	74.6
Romania	66.5	65.8	66.5	69.0	74.2
Russia pre-census	64.9	60.8	60.2	64.0	73.1
Russia post-census	*64.9*	*60.6*	*60.0*	*59.6*	*68.9*
Slovakia	67.1	67.8	68.8	71.6	76.6
Ukraine	65.5	62.2	62.7	66.7	74.0
Kazakhstan	63.6	60.5	58.6	63.6	73.0
Kyrgyzstan	63.5	63.2	62.8	68.3	74.9
Tajikistan	65.8	64.2	64.2	68.2	74.8
Turkmenistan	60.8	61.9	61.9	66.9	74.4
Uzbekistan	64.5	64.3	65.3	69.3	75.5
Armenia	67.4	68.0	69.3	71.9	76.6
Azerbaijan	65.4	65.6	67.2	70.7	76.2
Georgia	67.5	68.5	68.5	71.3	76.3
Estonia	65.9	62.9	64.3	68.3	74.7
Latvia	65.7	62.4	63.7	68.2	74.6
Lithuania	67.2	64.3	66.1	70.0	76.1
USA	71.4	72.2	73.6	76.4	80.0
Japan	75.5	76.2	77.0	79.3	83.5

Sources : UN, 2001 a, Table A.30, http://esa.un.org/unpp/ (December, 2005).

(1995-2000 : 10.8 yrs.), Kazakhstan (1995-2000 : 11.4 yrs.), and the Baltic States (1990-1995 : 11.3 to 11.6 yrs, 1995-2000 : 10.6 to 11.7 yrs) also had a relatively high gender differential.

The gender differential in almost all countries is expected to shrink after 2015, except for Japan, where the gender differential was predicted to reach 8.9 yrs between 2045 and 2050, the highest differential in the table for that period.

Table 12.6 Difference of Average Life Expectancy Between Sexes by Country (Female Life Expectancy-Male Life Expectancy)

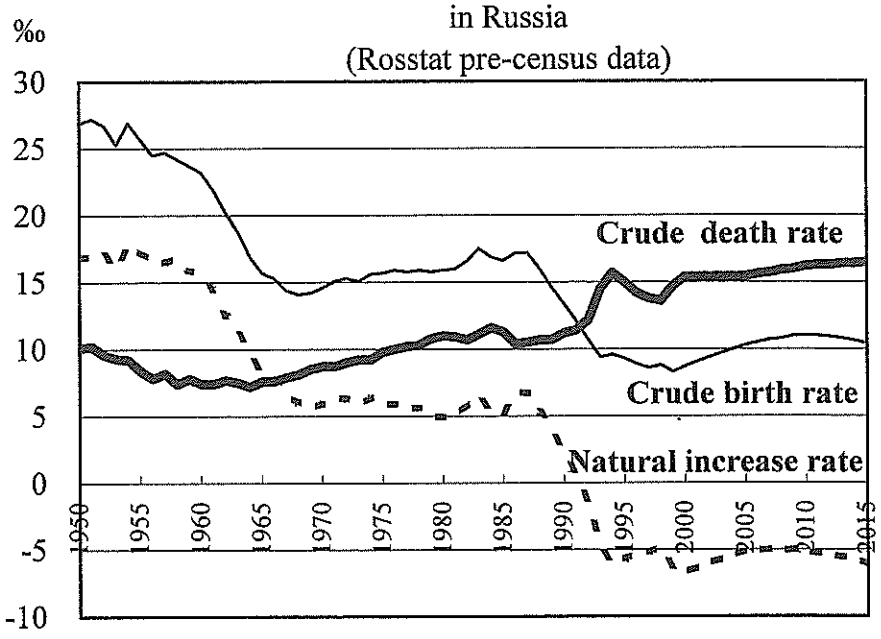
(pre-census ; *age*)

	1985-1990	1990-1995	1995-2000	2010-2015	2045-2050
European Average	7.6	8.3	8.3	7.4	6.1
East European Average	9.0	10.5	10.6	9.1	6.8
Belarus	9.0	10.4	11.6	9.9	6.8
Bulgaria	6.4	7.0	7.7	7.2	5.8
Czech	7.3	7.4	6.8	6.4	6.0
Hungary	8.1	9.1	8.8	7.9	6.4
Poland	8.5	8.9	8.4	7.6	6.4
Moldova	6.6	7.3	7.5	5.9	5.1
Romania	6.2	7.4	6.8	6.3	5.5
Russia pre-census	10.0	12.3	12.3	10.6	7.4
Russia post-census	*10.0*	*12.2*	*12.5*	*12.3*	*7.6*
Slovakia	8.1	8.4	8.0	7.0	5.8
Ukraine	8.7	9.8	10.8	8.8	6.8
Kazakhstan	9.5	9.8	11.4	9.5	6.7
Kyrgyzstan	7.8	8.6	8.3	6.2	5.8
Tajikistan	5.2	6.0	6.0	5.0	5.0
Turkmenistan	6.7	7.0	7.0	5.9	5.4
Uzbekistan	6.2	6.4	6.0	5.2	5.2
Armenia	4.8	6.6	6.1	5.9	5.3
Azerbaijan	8.2	8.4	7.3	6.4	5.6
Georgia	7.8	8.3	8.3	7.3	6.1
Estonia	9.1	11.3	11.3	9.7	6.8
Latvia	9.2	11.6	11.7	9.6	6.7
Lithuania	9.2	11.3	10.6	9.3	6.9
USA	7.0	6.7	5.8	5.6	5.3
Japan	5.8	6.2	6.8	7.9	8.9

Sources : UN, 2001 a, Table A.30, http://esa.un.org/unpp/ (December, 2005).

Unlike Rosstat, in the post-census projection UN made an upward revision for the gender differential by 1.7 yrs for 2010-2015 and 0.2 year for 2045-2050.

Figure 12.4 Crude Birth rate, Crude Death Rate, Natural Increase Rate in Russia (Rosstat pre-census data)



12.3.2 Birth rate and death (mortality) rate

Figure 12.4[5] indicates the change and expected value of the crude birth rate, crude death rate and natural increase rate (all in per mill ‰ i.e., per one thousand persons) based on the Rosstat pre-census medium variant.

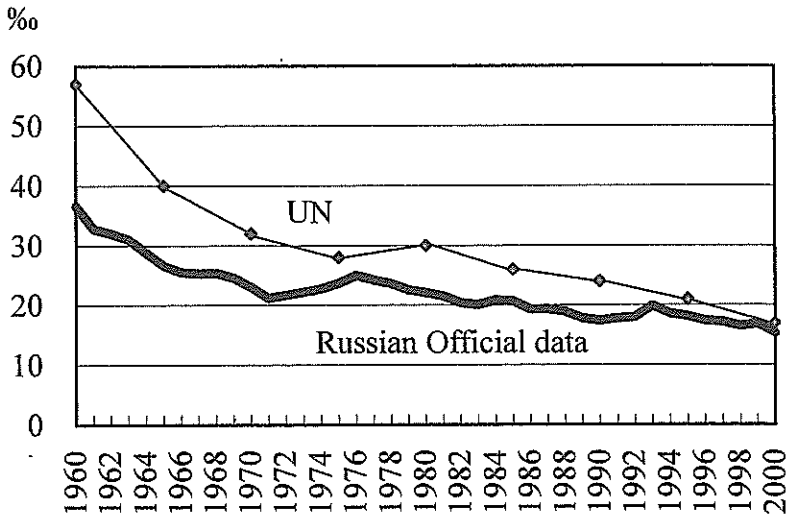
As a result of a 10.7‰ decrease in the crude birth rate and a 12.2‰ increase in the crude death rate in 1992, the natural increase rate marked a minus 1.5‰ for the first time after 1950 (the birth-death ratio became less than 1 ; 0.88). In 1993, due to a further decrease in the birth rate to 9.4‰, and a sharp increase in the death rate up to 14.5‰, the natural increase rate dropped to minus 5.1‰ (birth-death ratio fell to 0.65). The actual number of deaths in that year was 2.13 millions in comparison to 1.66 millions in 1990 ; an increase of 0.47 million. Although the birth rate increased slightly to 9.6‰ in 1994, the death rate further increased to 15.7‰, which resulted in the natural increase rate falling further to minus 6.1‰. The number of deaths in the same year was 2.3 millions. In 1995 the

birth rate was 9.3‰ and the death rate was 15‰, resulting in a minus 5.7‰of the natural increase rate. The number of deaths in that year was 2.2 millions. Although the levels between 1996-1998 showed an improvement in comparison to the 1994 level, the low birth rate (8.6 to 8.9‰) and the high death rate (13.6 to 14.2‰) resulted in negative natural increase rates, minus 4.8 to 5.3‰ (birth-death ratio was 0.63 to 0.65). Then, the situation worsened again for 1999-2000. In 1999, the birth rate was 8.3‰, and the death rate stood at 14.7‰ and thus the natural increase rate was minus 6.4‰, which was the lowest since 1950 (birth-death ratio at 0.57 and 214,000 deaths). In 2000, the birth rate was 8.7‰ and the death rate was 15.4‰. This lead to a natural increase rate of minus 6.7‰, which rewrote the previous record for the lowest natural increase rate (birth-death ratio at 0.57 and 226,000 deaths).

Although the Rosstat pre-census medium variant predicted a slight improvement in the birth rate (10 to 11‰) for 2005-2015. However, due to the high death rate (15.4 to 16.5‰), the natural increase rate remained below minus 5‰. In the Rosstat post-census medium variant, we can see a slight improvement in the birth rate (11 to 12‰) but no improvement in the death rate (16.1 to 16.5‰) for 2005-2015. In 2025 the birth rate and death rate are projected to be 9.8‰ and 16.7‰ respectively. Therefore, it can be stated that the mortality crisis in Russia is not a temporary phenomenon in the 1990 s but a long run one to continue after 2005.

Figure 12.5[6] indicates the change in the infant mortality rate (dead infants per 1000 births) based on the data by Rosstat and UN. It is a well known fact that infant mortality rate statistics in the former Soviet Union had a bias due to the difference in the definition of birth (pregnancy period of over 28 weeks, one week or more of survival after birth, height taller than 35 cm, and weight over one kg). The bias is said to have decreased after the adoption of the international standard method in 1995. Applying the conventional method, Russian infant mortality rate statistics should be inflated by 25% before 1992, 15% in 1993, and 10% in 1994 (UN, 2000, p. 229). What we can confirm here is that in spite of an increase in the infant mortality rate, 19.9‰ in 1993, the infant mortality rate generally showed a decreasing trend. This implies that the change in infant mortality rate was not a factor in the population crisis of the 1990 s.

Figure 12.5 Infant Mortality Rate : 1960-2000

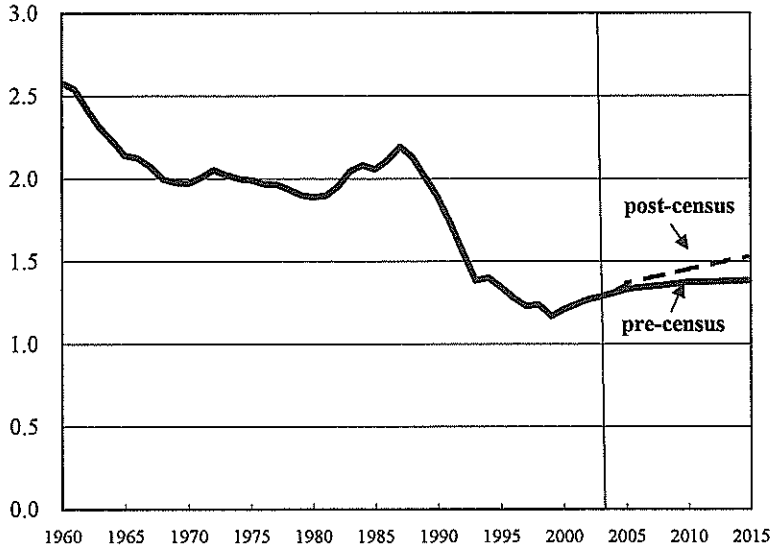


The Rosstat pre-census medium variant predicted the infant mortality rate to decrease to 10.3‰ by 2015 and reach 3.8‰ by 2050. Although the post-census projection of the infant mortality rate has not been published, it is likely to assume a very slight change between the pre-census and post-census projections. Therefore, the infant mortality rate can not be a major factor behind the long run depopulation.

Figure 12.6[7] displays changes in the total fertility rate (TFR ; children per a woman) based on the Rosstat medium variant. In Russia, TFR was stable and normal at approximately 2 during the period from 1970 to 1990. A dramatic decrease in TFR began in the 1990 s, and it dropped to a level of 1.4 after 1994. By 1999 the number fell to 1.17, which was the lowest ever. The TFR was 1.21 in 2000. The pre-census medium variant (a bold line in the figure) forecasted 1.38 in 2015 and just 1.4 in 2050. The post-census medium variant (a broken line in the figure) made a marked upward revision ; 1.53 in 2015 and 1.65 in 2025.

Table 12.7 indicates a result of an international comparison concerning crude birth rates based on the UN pre-census medium variant. Russia showed the largest decline in the birth rate from 1985-1990 to 1990-2000 (34%). Observing the change from 1985-1990 to 1995-2000, it is apparent that Armenia (51%), and Latvia (51%), saw larger decreases than Russia (45%). The birth rate in Russia

Figure 12.6 Total Fertility Rate (children per woman) (Rosstat data)



was predicted to stay at a low level until 2050. However, UN made an upward revision for Russia's birth rate by approximately two years for 2010-2050.

Table 12.8 shows the UN pre-census medium variant for TFR. Except for the United States, all countries displayed a clear trend of decline in the TFR and thus the number of births. The countries with the very high rate of decline in TFR from 1985-1990 to 1995-2000 were Armenia (46%), Latvia (46%), Estonia (43%), Russia (42%), Romania (42%) and Bulgaria (41%), i.e., an extreme decline can be observed in the countries in transition, excluding Central Asian countries. Therefore, a substantial fall in TFR is not a characteristic phenomenon that can be observed only in Russia, but is rather a common trend in most of the countries in transition. The UN pre-census medium variant TFR forecast of 1.18 for 2010-2015 was more pessimistic than that of the Rosstat pre-census projection, while for 2045-2050 the UN forecast of 1.75 was more optimistic than the Rosstat projection. In the post-census projection UN made an upward revision for Russia's TFR ; 1.44 for 2010-2015 (slightly lower than the Rosstat new projection) and 1.85 for 2045-50. This explains the UN upward revision of births stated in the above. Anyhow, both Rosstat and UN made an upward revision for TFR.

Table 12.7 Crude Birth Rate by Country

(pre-census, ‰)

	1985-1990	1990-1995	1995-2000	2010-2015	2045-2050
European Average	13.7	11.5	10.1	9.0	9.1
East European Average	15.5	11.3	9.2	9.1	9.1
Belarus	15.9	11.9	9.2	9.5	9.4
Bulgaria	13.0	10.2	8.0	7.8	8.8
Czech	12.9	11.5	8.8	8.0	8.9
Hungary	12.0	11.7	9.8	8.4	9.6
Poland	16.0	13.2	10.5	10.0	10.7
Moldova	21.2	15.5	12.3	11.4	10.2
Romania	16.1	11.4	10.3	9.8	10.5
Russia pre-census	16.0	10.6	8.8	9.0	8.7
Russia post-census	*16.0*	*10.6*	*8.9*	*11.0*	*10.5*
Slovakia	16.3	13.7	10.8	9.7	8.4
Ukraine	14.4	11.2	8.9	8.4	8.2
Kazakhstan	24.6	19.7	16.9	16.0	11.7
Kyrgyzstan	33.2	27.5	23.2	18.9	13.9
Tajikistan	40.2	34.0	28.8	21.3	14.1
Turkmenistan	35.7	32.5	28.6	19.9	13.9
Uzbekistan	36.0	30.9	24.4	20.1	13.6
Armenia	22.7	17.7	11.2	9.8	7.8
Azerbaijan	26.5	23.4	16.1	12.9	10.4
Georgia	17.5	14.2	11.7	9.9	9.6
Estonia	15.6	11.0	8.7	9.2	10.1
Latvia	15.5	11.3	7.7	8.6	9.8
Lithuania	15.9	13.4	10.2	8.7	9.7
USA	16.0	15.6	14.5	12.8	12.6
Japan	10.5	9.7	9.8	8.3	7.9

Sources : UN, 2001 a, Table A.21, http://esa.un.org/unpp/(December, 2005).

Table 12.9 shows the UN pre-census medium variant concerning death or mortality rate. Russia showed the highest increase in the death rate, a 22% increase, from 1985-1990 through 1990-1995, followed by Ukraine (a 20% increase), and Belarus (an 18% increase). Meanwhile, during 1995-2000, Ukraine had a higher death rate (14.7‰) than Russia (14.3‰). Unlike in Russia, Ukraine and other former Soviet republics, the death rate in East European countries,

Table 12.8 Total Fertility Rate by Country

(pre-census, persons)

	1985-1990	1990-1995	1995-2000	2010-2015	2045-2050
European Average	1.83	1.58	1.41	1.34	1.81
East European Average	2.10	1.60	1.28	1.22	1.84
Belarus	2.04	1.66	1.27	1.26	1.86
Bulgaria	1.92	1.48	1.14	1.17	1.89
Czech	1.92	1.64	1.18	1.22	1.97
Hungary	1.82	1.73	1.37	1.26	1.97
Poland	2.15	1.89	1.46	1.32	2.10
Moldova	2.64	2.12	1.61	1.34	1.90
Romania	2.28	1.50	1.32	1.37	2.05
Russia pre-census	2.13	1.52	1.23	1.18	1.75
Russia post-census	*2.13*	*1.55*	*1.24*	*1.44*	*1.85*
Slovakia	2.15	1.87	1.40	1.31	1.70
Ukraine	1.96	1.58	1.26	1.15	1.70
Kazakhstan	3.03	2.46	2.10	1.90	1.90
Kyrgyzstan	4.02	3.45	2.89	2.10	2.10
Tajikistan	5.41	4.43	3.72	2.33	2.10
Turkmenistan	4.55	4.03	3.60	2.31	2.10
Uzbekistan	4.40	3.60	2.85	2.10	2.10
Armenia	2.58	2.10	1.39	1.14	1.70
Azerbaijan	2.83	2.64	1.94	1.44	1.90
Georgia	2.26	1.87	1.58	1.34	1.90
Estonia	2.18	1.59	1.24	1.27	2.00
Latvia	2.09	1.63	1.12	1.18	2.00
Lithuania	2.09	1.78	1.38	1.19	2.00
USA	1.92	2.05	2.04	1.90	2.10
Japan	1.66	1.49	1.41	1.43	1.75

Sources : UN, 2001 a, Table A.24, http://esa.un.org/unpp/ (December, 2005).

such as Czech and Poland declined in the 1990 s ; an exception was Hungary, which had a relatively high death rate of 14‰. This suggests that the early transition in general did not appear to have affected the death rate.

Table 12.10 indicates the results of the calculation of birth-death ratios derived from the pre-census medium variant projections.

From 1985-1990 to 1990-1995, Russia suffered the largest change

Table 12.9 Crude Death Rate by Country

(pre-census, ‰)

	1985-1990	1990-1995	1995-2000	2010-2015	2045-2050
European Average	10.6	11.2	11.5	12.1	15.7
East European Average	11.1	12.7	13.4	13.8	16.7
Belarus	10.1	11.9	13.4	13.7	16.2
Bulgaria	12.0	12.8	14.3	15.5	17.6
Czech	12.9	11.7	10.9	11.2	16.5
Hungary	13.8	14.3	14.0	13.4	16.1
Poland	10.1	10.3	9.9	10.6	14.8
Moldova	10.1	10.8	11.8	11.3	14.0
Romania	10.8	11.4	12.0	13.1	16.0
Russia pre-census	10.9	13.3	14.3	14.7	17.3
Russia post-census	*10.9*	*13.3*	*14.2*	*16.2*	*16.8*
Slovakia	10.5	10.0	9.9	10.5	15.5
Ukraine	11.6	13.9	14.7	14.8	17.5
Kazakhstan	7.8	9.3	10.0	9.6	11.5
Kyrgyzstan	7.7	7.5	7.6	6.7	8.9
Tajikistan	7.3	7.1	6.7	5.8	8.0
Turkmenistan	8.2	7.5	7.2	5.9	8.2
Uzbekistan	7.2	6.8	6.2	5.7	8.5
Armenia	6.8	6.8	7.3	8.4	15.8
Azerbaijan	6.6	6.7	6.2	7.0	12.5
Georgia	8.7	8.9	9.4	11.1	15.2
Estonia	11.9	13.5	13.3	13.7	16.3
Latvia	12.4	14.5	13.4	14.2	17.2
Lithuania	10.4	11.7	11.2	11.9	15.9
USA	8.7	9.0	8.5	8.3	10.8
Japan	6.3	6.9	7.6	9.8	14.3

Sources : UN, 2001 a, Table A.27, http://esa.un.org/unpp/ (December, 2005).

from 1.47 to 0.80 (a 46% decline), followed by Estonia from 1.31 to 0.81 (a 38% decline), Latvia from 1.25 to 0.78 (a 38% decline), Belarus from 1.57 to 1.00 (a 36% decline), and Ukraine from 1.24 to 0.81 (a 35% decline). Due to a sharp decrease in the number of births and a marked increase in the number of deaths, these former Soviet republics, except for Belarus, showed a change in natural population increase from plus to minus in the early transition. In other words,

Table 12.10 Birth-Death Ratio by Country

(pre-census)

	1985-1990	1990-1995	1995-2000	2010-2015	2045-2050
European Average	1.29	1.03	0.88	0.74	0.58
East European Average	1.40	0.89	0.69	0.66	0.54
Belarus	1.57	1.00	0.69	0.69	0.58
Bulgaria	1.08	0.80	0.56	0.50	0.50
Czech	1.00	0.98	0.81	0.71	0.54
Hungary	0.87	0.82	0.70	0.63	0.60
Poland	1.58	1.28	1.06	0.94	0.72
Moldova	2.10	1.44	1.04	1.01	0.73
Romania	1.49	1.00	0.86	0.75	0.66
Russia pre-census	1.47	0.80	0.62	0.61	0.50
Russia post-census	*1.47*	*0.80*	*0.63*	*0.68*	*0.63*
Slovakia	1.55	1.37	1.09	0.92	0.54
Ukraine	1.24	0.81	0.61	0.57	0.47
Kazakhstan	3.15	2.12	1.69	1.67	1.02
Kyrgyzstan	4.31	3.67	3.05	2.82	1.56
Tajikistan	5.51	4.79	4.30	3.67	1.76
Turkmenistan	4.35	4.33	3.97	3.37	1.70
Uzbekistan	5.00	4.54	3.94	3.53	1.60
Armenia	3.34	2.60	1.53	1.17	0.49
Azerbaijan	4.02	3.49	2.60	1.84	0.83
Georgia	2.01	1.60	1.24	0.89	0.63
Estonia	1.31	0.81	0.65	0.67	0.62
Latvia	1.25	0.78	0.57	0.61	0.57
Lithuania	1.53	1.15	0.91	0.73	0.61
USA	1.84	1.73	1.71	1.54	1.17
Japan	1.67	1.41	1.29	0.85	0.55

Note : Compiled by UN, 2001 a, Table A.21 and A.27, and http://esa.un.org/unpp/(December, 2005). Birth-death ratio is crude birth figure/crude death figure.

we can see the emergence of a population crisis in transition. Birth-death ratios for 1995-2000 in Russia, Ukraine, Estonia, Latvia, and Belarus fell to 0.62, 0.61, 0.65, 0.57, and 0.69, respectively. This implies that Belarus also experienced negative natural population growth during this period.

Among East European countries, Bulgaria's birth-death ratio

decreased from 1.08 in 1985-1990 to 0.80 in 1990-1995, and further to 0.56 in 1995-2000, displaying signs of a population crisis. Romania's birth-death ratio also decreased from 1.49 in 1985-1990 to 1.00 in 1990-1995, and further to 0.86 in 1995-2000.

Meanwhile, in Hungary, the birth-death ratio had been below 1 and a decrease in population could be observed even before the transition period. Although this trend was made stronger during the 1990 s, the transition process itself did not seem to have strongly influenced the birth-death ratio. This can also be true for Czech. In Poland, the birth-death ratio had been relatively high at 1.58 during 1985-1990, but the drop was larger in the 1990 s than in Czech and Hungary.

The birth-death ratios in Russia, Ukraine, Belarus, and Estonia were not expected to improve after 2000, and they are estimated to be in the range between 0.47 and 0.62 for 2045-2050. The population in the Caucasus region was also expected to decrease after 2000. Among former Soviet republics, only the five Central Asian countries were projected not to experience depopulation in the first half of the 21st century.

12.4 Russia's population loss in the 1990s

As we have seen in the previous section, the Russian population crisis in the 1990 s developed through the peculiar situation of concurrent decrease and increase in the number of births and deaths. Regarding death rates, the remarkably steep rise in the male death rate is a distinctive characteristic of the crisis. In what age group was the death rate high, and what was the size of population loss of the 1990 s? In this section we will focus on the male case.

Table 12.11 shows male death rates by age group. Table 12.12 presents premature male deaths due to the transition, which were calculated from Table 12.11 and time-series data on the male population by age group. The upper section of this table shows the number of premature deaths. Here, the death rates for 1990 by age group were applied to 1991-2000 mid-year population data. These figures were subtracted from the actual deaths in the respective age group for each year. The lower section of the table indicates the share of the number of premature deaths in the number of actual

Table 12.11 Male Mortality Rate by Age : Russia

(‰)

	1980-81	1985-86	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
average	11.9	11.0	11.6	11.9	13.1	16.1	17.8	16.9	15.8	15.0	14.8	16.3	17.4
age groups													
0-4	6.5	6.0	4.4	4.4	4.3	4.5	4.6	4.6	4.5	4.5	4.5	4.6	4.4
5-9	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
10-14	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
15-19	1.8	1.4	1.6	1.7	1.8	2.1	2.1	2.4	2.2	1.9	1.9	2.0	2.2
20-24	3.2	2.5	2.6	2.7	3.2	3.8	4.0	4.3	4.2	3.9	4.1	4.5	5.0
25-29	4.3	3.0	3.3	3.5	4.2	5.1	5.5	5.4	5.0	4.6	4.6	5.2	6.0
30-34	5.4	3.9	4.3	4.5	5.5	7.0	7.7	7.4	6.6	5.9	5.8	6.5	7.0
35-39	7.9	5.0	5.6	5.9	7.1	9.3	10.6	10.0	8.6	7.7	7.5	8.4	9.1
40-44	9.8	8.1	7.6	8.0	9.8	13.3	15.2	14.1	12.2	10.6	10.2	11.5	12.6
45-49	13.7	10.7	11.7	11.6	13.5	17.8	20.8	19.3	17.0	14.8	14.4	16.2	17.7
50-54	17.9	16.2	16.1	16.5	19.4	25.3	29.1	27.3	23.7	20.4	19.5	22.3	24.4
55-59	24.7	22.7	23.4	23.3	25.3	31.3	36.2	34.0	31.1	29.5	28.6	31.5	33.7
60-64	35.5	32.8	34.2	34.6	36.9	45.3	51.0	47.1	43.1	40.0	38.1	42.5	45.0
65-69	48.8	48.0	46.6	47.3	49.4	59.4	64.2	61.3	58.3	56.9	55.3	59.0	60.4
70 or over	100.9	97.6	103.6	104.0	105.7	118.8	121.4	112.0	105.1	100.0	97.0	100.8	101.9

Source : *RSE* 2001, p. 126.

Table 12.12 Estimated Number of Premature Death in Russian Males

(*thousands*)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	1992-1996	1992-2000
(*thousands*)												
0-4	0	0	0	1	1	0	0	0	1	0	2	3
5-9	1	0	0	0	0	−1	−1	0	0	0	−1	−2
10-14	1	1	1	1	1	0	0	0	0	0	2	2
15-19	1	1	3	3	4	3	2	2	2	4	14	24
20-24	0	3	6	7	9	8	7	8	10	13	34	72
25-29	1	4	9	11	10	8	7	7	10	14	43	80
30-34	1	8	17	20	18	13	8	7	11	13	75	115
35-39	2	9	23	32	28	19	13	12	17	20	112	174
40-44	2	12	32	44	38	27	18	16	24	31	153	241
45-49	0	6	24	41	34	26	16	14	24	33	131	217
50-54	2	13	29	35	30	19	11	10	22	34	125	203
55-59	0	7	33	55	46	33	24	18	23	24	173	262
60-64	1	9	34	49	38	26	17	13	29	39	156	254
65-69	2	7	35	50	42	34	29	23	30	32	168	281
70+	1	5	36	44	21	4	−10	−20	−9	−6	110	64
Total	14	85	283	392	319	220	142	109	193	250	1298	1992
(Estimated number of premature death/Actual number of age-specific death ; %)												
0-4	0	−2	2	4	4	2	2	2	4	0	2	2
5-9	13	0	0	0	0	−17	−17	−17	−17	−17	−3	−6
10-14	14	14	14	14	14	0	0	0	0	0	12	8
15-19	6	11	24	24	33	27	16	16	20	27	25	23
20-24	4	19	32	35	40	38	33	37	42	48	33	37
25-29	6	21	35	40	39	34	28	28	37	45	34	35
30-34	4	22	39	44	42	35	27	26	34	39	37	35
35-39	5	21	40	47	44	35	27	25	33	38	39	36
40-44	5	22	43	50	46	38	28	25	34	40	41	38
45-49	−1	13	34	44	39	31	21	19	28	34	35	31
50-54	2	17	36	45	41	32	21	17	28	34	34	31
55-59	0	8	25	35	31	25	21	18	26	31	26	25
60-64	1	7	25	33	27	21	15	10	20	24	23	21
65-69	1	6	22	27	24	20	18	16	21	23	21	20
70+	0	2	13	15	7	1	−4	−7	−3	−2	8	2
Total	2	9	25	31	27	20	14	11	17	21	23	20

Notes :

1. Mid-year population for 1991-2000 : Year *t*'s mid-year male population by age is computed by data supplied by Rosstat (Goskomstat) as (year (*t*-1) year-end population+year *t*'s year-end population)/2. (For years 1993-2000 data from *DER* various issues can also be employed.)

2. Year *t*'s mid-year male population by age×year *t*'s death rate (Table 12.11)/1000=year *t*'s actual number of death.
(the number of death for the years 1990 and 1993-2000 can be found in *DER* various issues. But we employed here calculated values.)

3. Year *t*'s number of premature male death by age=year *t*'s number of actual death by age minus year *t*'s mid-year male population by age× (death rate in 1990)/1000.

deaths by age group, namely premature death ratio.

The number of male premature deaths totaled 1.3 millions of premature deaths during 1992-1996 (the premature death ratio was 23%), while 2 million men died prematurely during 1992-2000 (the premature death ratio was 20%). This means that 1 out of 5 men was a victim of the transition process. The number of premature deaths for the 15-59 yrs age group was 860 thousands during 1992-1996 and 1.4 millions during 1992-2000. The number of premature deaths for the 60 yrs or over age group (eligible old age pension recipients) was 430 thousands during 1992-1996, and 600 thousands during 1992-2000. Thus the number of premature deaths in the working age group was twice that in the old age population. Premature deaths during the transition process in Russia are characterized by the fact that they primarily affect the working age group population.

When we look at the premature death ratio, we can observe a rapid growth from 9% in 1992 to 25% in 1993, followed by a peak of 31% in 1994. It gradually decreased for 1995-1998 from 27% to 20%, then to 14%, and finally to 11%. However, it once again began to increase, and reached 17% in 1999 and 21% in 2000.

The 40-44 yrs age group suffered the highest premature death during 1993-1996, and the premature death ratio reached 50% (i.e., 1 out of 2 men was a victim). The second highest figure was recorded by the 35-40 yrs age group. It can be said that during this period the premature death ratios in all age groups between 20-54 yrs were markedly high. It is particularly conspicuous that the highest and second highest premature death ratios for 1996-2000 were recorded by the 20-24 yrs group (48% in 2000) and the 25-29 yrs group (45% in 2000). The premature deaths of young people in their 20 s significantly contributed to the recent increase in the premature death ratio.

For 1993-1995 the premature deaths of middle-aged people in their early 40 s became a social problem. Social implications of premature deaths of young people in their early 20 s for 1999-2000 should require further investigation. The premature death ratio of school children in the 5-9 yrs age group for 1996-2000 as well as that of the elderly in the 70 yrs on over group during 1997-2000 improved.

12.5 Dependency ratios

Dividing the Russian population into three demographic groups ; child, working-age and elderly (aged) groups, based on the tradition of demographics, we analyze the relationship between these groups. The Russian standard system defines child, working-age and elderly (pension eligibility age) as follows :

child population : aged 0-15 for males and females ; working-age population : aged 16-59 for males and aged 16-54 for females ; elderly (old-age) population : aged 60 or over for males and aged 55 or over for females.

The international standard system for demographic grouping is as follows :

child population : aged 0-14 for males and females ; working-age population : aged 15-64 for males and females ; elderly (old-age) population : aged 65 or over for males and females.

Child and elderly population groups are considered to depend on working-age population. Demographic structure ratios, which show how much burden is imposed on the working-age population by child and/or elderly population, are defined as follows :

child dependency ratio=child population/working-age population×100

elederly dependency ratio=elderly population/working-age population×100

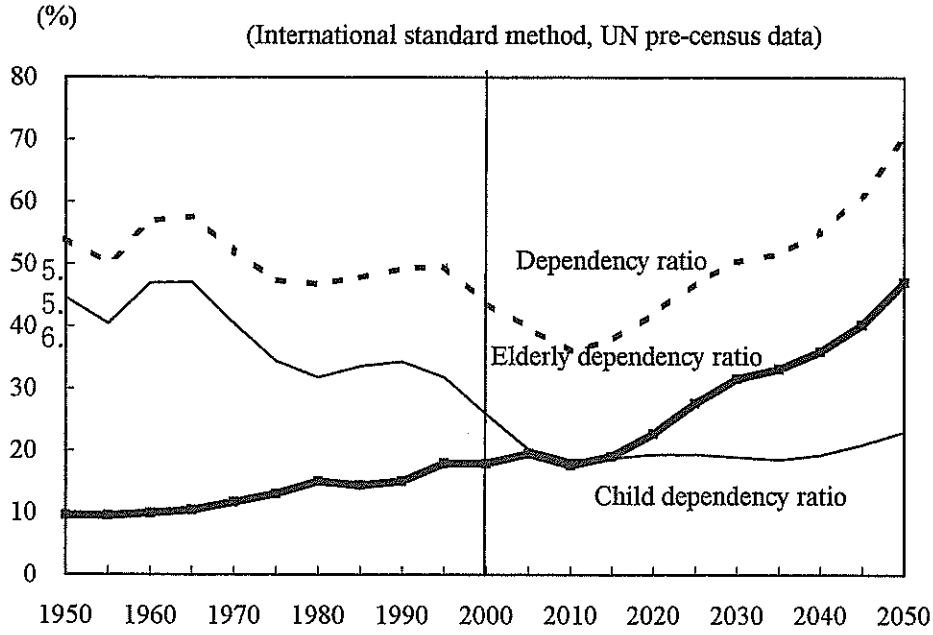
dependency ratio=(child population+elderly population)/working-age population×100

In Russia, instead of these dependency ratios, the demographic burden coefficient (*koeffitsient demograficheskoi nagruzki*) is commonly used, substituting the above factor (100) by 1,000.

Figure 12.7[8] shows changes in dependency ratios, based on the UN pre-census medium variant projection (international standard system).

The elderly dependency ratio showed a gradual increase from 9.5 in 1950 to 11.7 in 1970 and to 15.0 in 1980. After 1980, the ratio stabilized until 1990, but then it again increased to 17.9 in 1995 and reached 18.0 in 2000. In 1995, the ratio increased because the working-age population decreased by 0.6 million, whereas the elderly

Figure 12.7 Dependency Ratios : 1950-2050 (International standard method, UN pre-census data)



population increased by 3 million. According to the medium variant projection, the ratio was predicted to remain stable until 2015 (19.5 in 2005, 17.6 in 2010, and 19.0 in 2015), but then it was estimated to show a rapid increase, overtaking the child dependency ratio, and reach 47.0 in 2050.

The child dependency ratio dropped considerably from 1965 until 1980 and then showed a slight increase until 1990, before a sharp declining. The decrease was projected to continue until 2010 and then stabilize until 2035. It was predicted to show some increase afterwards. The sharp decline in the child population was obviously caused by the marked decline in the total fertility rate.

Table 12.13, based on the Rosstat pre-census medium variant projection, displays dependency ratios by both international and Russian standard systems. Figure 12.8 is a graphical display for the Russian system case.[9]

When the international standard system is employed, the Rosstat data are not different from the UN data. The ratios in the two data series are very close for the past years. The elderly dependency ratio in 2015 was estimated to be 19 in both projections, but the child

Table 12.13 Dependency Ratios in Russia (data by Rosstat (Goskomstat))
(year-end value)

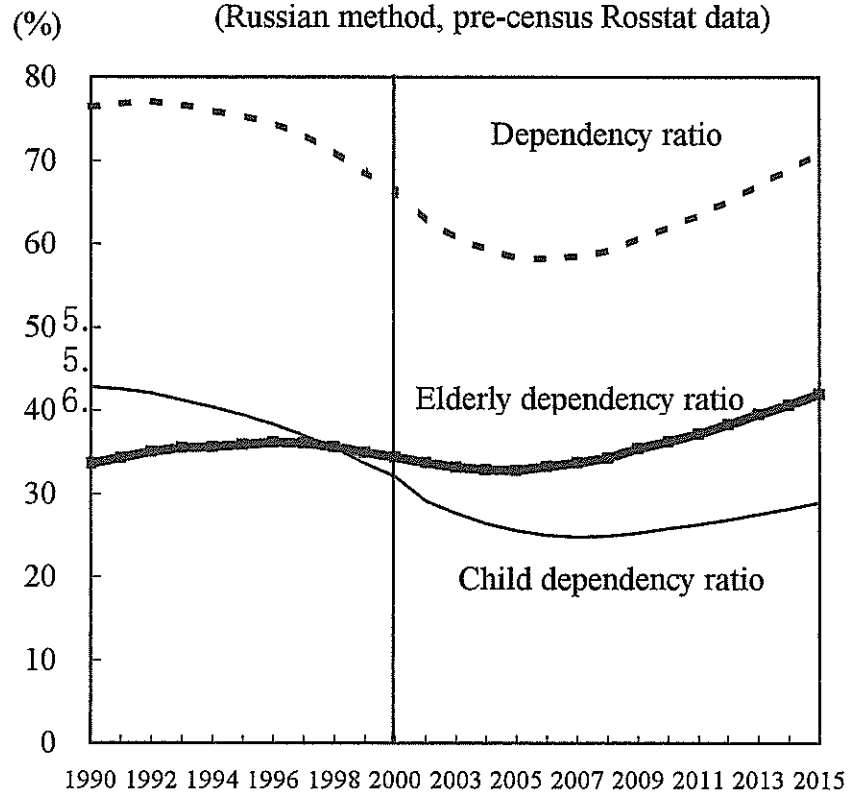
	Russian Standard System			International Standard System		
	Child Dependency Ratio	Elderly Dependency ratio	Dependency ratio	Child Dependency Ratio	Elderly Dependency ratio	Dependency ratio
1989	43.0	32.9	75.9	34.4	14.7	49.1
1990	42.9	33.6	76.4	34.2	15.2	49.4
1991	42.6	34.2	76.8	33.9	15.9	49.8
1992	42.2	34.9	77.1	33.5	16.6	50.1
1993	41.2	35.4	76.7	32.8	17.3	50.1
1994	40.4	35.6	76.0	32.2	17.7	49.9
1995	39.7	35.6	75.3	31.4	18.1	49.5
1996	38.3	36.2	74.5	30.4	18.4	48.7
1997	37.0	36.1	73.1	29.2	18.5	47.7
1998	35.5	35.6	71.0	27.8	18.3	46.1
1999	33.7	35.0	68.6	26.4	18.1	44.5
2000	32.2	33.9	66.2	25.4	17.8	43.1
2001	30.7	33.8	64.5	23.2	18.4	41.5
2002	29.3	33.2	62.5	23.0	18.4	41.4
2003	27.8	32.5	60.4	22.1	18.9	41.0
2004	26.7	32.3	59.0	21.5	19.3	40.8
Pre-census data						
2005	25.5	32.8	58.3	20.7	19.9	40.6
2010	25.8	36.2	62.0	20.6	17.5	38.1
2015	28.9	42.0	70.9	22.7	19.2	41.9
Post-census data						
2005	25.9	32.1	58.0	20.9	19.4	40.3
2010	26.4	35.0	61.4	21.2	16.7	37.9
2015	30.5	40.4	70.9	24.1	18.3	42.4
2025	33.8	46.5	80.3	26.4	24.3	50.8

Notes : Compiled by *DER.*, *RSE,* various issues, *Predpolozhitel'naia*…, 2001, 2005.
Russian system : child (0-15), working age (male 16-59, female 16-54), elderly (male 60 or over, female 55 or over).
International system : child (0-14), working age (male/female 15-64), elderly (male/female 65 or over).

dependency ratio by UN, 19 was less than that by Rosstat, 23.

The elderly dependency ratio based on the Russian system showed a slight increase from 33.6 in 1990 to 36.2 in 1996 ; then it decreased to 34.3 in 2000. The population ratio of the elderly in the total population was 20.6% in 2000. The population crisis for 1993-1995 showed a slight increase in the elderly dependency ratio, while

Figure 12.8 Dependency Ratios : 1990-2015 (Russian method, pre-census Rosstat data)



the crisis in 1999-2000 brought about a slight decrease in the ratio. Looking at only the 1990 s, the population crisis was not likely to have influenced the elderly dependency ratio.

The Rosstat pre-census medium variant projection of the elderly dependency ratio expected to increase after 2005, reach 36.2 (the 1996 level) in 2010 and 42 in 2015. The Rosstat post-census projection of the elderly dependency ratio also estimates to amount to 35 in 2010, 40.4 in 2015 and 46.5 in 2025. There are only slight differences between pre-census and post-census projections of the elderly dependency ratio. The crisis in the 1990 s is likely to have restrained an increase in the elderly dependency ratio until 2015. The crisis in the 1990 s worked to relax the pension burden for 2000-2015. This is because the excessive number of premature deaths in generations of 30 s, 40 s and 50 s during the first half of the 1990 s worked to make the ratio of the elderly population smaller in 2000-2015 than the ratio

assumed without the transition. The marked drop in the birth rate in the 1990 s would begin to show an effect on the share of the working-age population with a time-lag (after 2010).

Based on the Rosstat pre-census estimate (*O Vozmozhnykh...*, 2002), the impact of the decrease in the working-age population share in association with the low fertility rate and the increase in the elderly population share was projected to be serious after 2020. The elderly dependency ratio was estimated to increase from 45.5 in 2020 to 70.8 in 2050. The elderly population share in 2050 was predicted to be 35.2%. The controlling effect of the crisis in 1990 s over an increase in the elderly dependency ratio was estimated to be overshadowed by the long run population crisis, which has been brought about by the low fertility rate and triggered by the population crisis in the 1990 s. Therefore a Russian version of aging society was expected to appear in the future.

The child dependency ratio by Rosstat showed a rapid decline from 43 in 1990 to 32 in 2000. In 1998 the child dependency ratio became lower than the elderly dependency ratio. Then the difference between child and elderly dependency ratios continued to grow. The Rosstat pre-census medium variant projection of the child dependency ratio estimated to show a continuing decline from 2000 to 2007, and to stabilize for a while. However, it was projected to re-begin to drop from 2010 and reach 28.9 in 2015. After 2015, a slight recovery in the fertility rate and a decrease in the share of the working-age population were expected to push the child dependency ratio up and reach 30.4 in 2050 through a rapid growth in the 2040 s.

Table 12.14 shows an international comparison of dependency ratios based on the UN pre-census medium variant. The increase in Russia's elderly dependency ratio from 1990 to 2000 (from 15 to 18, a 20% increase) was higher than the European average (from 19 to 21, an 11% increase). However, it should be noted that the increases in the elderly dependency ratio in some East European countries, such as Romania (15 to 19, a 27% increase), Bulgaria (19 to 24, a 26% increase), Belarus (16 to 20, a 25% increase), were estimated to be greater than the Russian case. The increase in three Caucasian countries in the range between 36% and 44% was projected to be much higher than these East European cases. Japan also went through a large increase (from 18 to 25, a 39% increase). Regarding

Table 12.14 International Comparison of Dependency Ratio (International Standard System)

	Child Dependency Ratio				Elderly Dependency ratio				Dependency ratio			
	1990	2000	2015	2050	1990	2000	2015	2050	1990	2000	2015	2050
European Average	31	26	20	25	19	21	26	51	50	47	46	76
East European Average	35	26	19	24	16	19	21	48	51	45	40	72
Belarus	35	27	20	25	16	20	19	46	51	47	39	71
Bulgaria	31	23	17	25	19	24	26	53	50	47	43	78
Czech	32	24	19	25	19	19	27	61	51	43	46	86
Hungary	30	25	19	25	21	21	25	52	51	46	44	77
Poland	39	28	21	28	15	18	21	49	54	46	42	77
Moldova	44	34	23	25	13	14	14	39	57	48	37	64
Romania	36	27	22	27	15	19	20	45	51	46	42	72
Russia pre-census	34	26	19	23	15	18	19	47	49	44	38	70
Russia post-census	*34*	*26*	*23*	*27*	*15*	*18*	*19*	*38*	*49*	*44*	*42*	*66*
Slovakia	39	28	21	23	16	17	19	50	55	45	40	73
Ukraine	32	26	18	22	19	20	22	49	51	46	40	71
Kazakhstan	50	41	32	28	10	10	11	28	60	51	43	56
Kyrgyzstan	65	57	36	31	9	10	9	25	74	67	45	56
Tajikistan	81	70	40	30	8	8	7	22	89	78	47	52
Turkmenistan	73	65	42	30	6	7	7	21	79	72	49	51
Uzbekistan	74	61	38	31	8	8	7	24	82	69	45	55
Armenia	47	35	19	21	9	13	13	50	56	48	32	71
Azerbaijan	53	45	23	25	8	11	11	39	61	56	34	64
Georgia	37	31	21	25	14	19	21	47	51	50	42	72
Estonia	33	26	20	27	18	21	24	47	51	47	44	74
Latvia	32	26	18	26	18	21	26	50	50	47	44	76
Lithuania	34	29	18	26	16	20	24	51	50	49	42	77
USA	33	33	29	31	19	19	19	35	52	52	48	66
Japan	26	22	22	24	18	25	42	72	44	47	64	96

Note : Compiled by UN, 2001 a, Table A.35, Corrigendum, and http://esa.un.org/unpp/ (December, 2005).

the increase in the elderly dependency ratio for 2000-2015, the increase in Russia (from 18 to 19, a 6% increase) was estimated to be smaller than that of the European average (21 to 26, a 24% increase) and the East European average (19 to 21, an 11% increase). This is because the average life expectancy in Russia was projected to be still relatively low and its mortality rate was estimated to be high. The change in Poland was estimated to be similar to that in Russia. However, during the same period the elderly dependency ratio in the Czech Republic and Hungary was expected not to show any change. The increase in the elderly dependency ratio in Japan (from 25 to 42, a 68% increase) was estimated to be exceptionally high during the same period. From 2015 to 2050, the increase in the elderly dependency ratio of Russia was forecasted to be over that of the East European average but under that of Moldova and Slovakia. The elderly dependency ratio in 2050 was estimated to be Czech (61), Bulgaria (53), Hungary (52), Slovakia (50), and Ukraine (49), all of which were projected to be larger than the elderly dependency ratio of Russia (47). With the exceptions of three Caucasian countries and the United States, Russia was expected to face critical aging society problems.

The decline in Russia's child dependency ratio between 1990 and 2000 (from 34 to 26, a 24% decrease) was larger than the declines in the European average (from 34 to 26, a 16% decrease) and Japan (from 26 to 22, a 15% decrease). However, the decline in Russia was smaller than that in the East European average (from 35 to 26, a 26% decrease). The fall for 2000-2015 in Russia was expected to be near that in the East European average. The ratio of Russia (23) was estimated to be lower than the ratios of all other countries in the table, excluding Ukraine (22). However, the differences of the ratios of the countries in the table were expected to be rather small, because Russia's birth rate was projected to continue to decline. A marked fall in the working-age population was expected in Russia.

Based on the UN post-census medium variant projection, Russia's elderly dependency ratio is estimated to be 19 in 2015 (the same level as in the pre-census projection), while it is projected to be 38 in 2050, which shows Russia's rather excellent position from the viewpoint of the pension load in the future.

It can be stated that, based on the international standard system,

the changes in the dependency ratios in Russia are expected to be relatively small from the viewpoint of the cross country comparison. This is resulted from the population crisis in the 1990 s and the long run depopulation which are interacting in a complex way.

12.6 Estimating Russia's population in 1995 using the cohort component method

In order to investigate further the population crisis in 1990 s, the population by age and sex in the year 1995 (mid-year value) is estimated, using the data on populations in 1985 and 1990 (mid-year values) and the cohort component method (cohort change rates). The estimates are made through the following two stages :

(1) We compute the cohort change rates by sex for age groups from 1985 to 1990 (base years), and then, we applied these rates to estimate the numbers of population of each class by five years interval for all persons from 5 to 99 years old in 1995. (We excluded the population 100 years or over.)

(2) We calculate the number of the birth rates by five years interval for all mothers from 15 to 49 years old in the year 1990 and the average ratio of two sexes of births for 1989-1991. (*Naselenie*...., 1998). We estimate the population by sex for children from 0 to 4 years old as follows. The cumulative number of births for five years=the number of each class of 15-49 yeas old females by five years interval (15 to 49 years old) in the year 1990×mothers' birth rate by age class×5. Employing the average birth sex ratio, we can estimate the 0-4 years old population by sex in 1995.

The estimates are shown in the 3 left-hand columns in Table 12.15. Subtracting the officially recorded values from our 1995 estimates, we obtain the 3 right-hand columns in the table. From this table, the population loss in 1995 due to the population crisis could be estimated as 1.6 million males, 1.1 million females and thus 2.7 millions in total. The population loss, 1.97 millions, caused by the drop in the fertility rate during the first half of the 1990 s accounts for the large part of the total population loss. When the 0-4 years old age group is excluded, the loss is estimated to be 0.61 million for males and 0.13 million for females, the total of which is 0.74 million. The population loss for males for 20-59 yrs is estimated to be 0.46

Table 12.15 An Estimate of Russia's population in 1995 based on the Cohort Component Method

Age	Estimate for 1995 (thousands)			Estimate minus Recorded Value (thousands)		
	Male	Female	Total	Male	Female	Total
0-4	5,035	4,821	9,856	986	981	1,967
5-9	5,904	5,685	11,589	−44	−18	−62
10-14	5,968	5,787	11,755	−40	−27	−67
15-19	5,502	5,346	10,848	8	10	19
20-24	5,319	5,086	10,405	65	99	164
25-29	4,912	4,667	9,579	39	22	61
30-34	5,878	5,791	11,669	−8	−11	−19
35-39	6,439	6,429	12,868	58	−19	38
40-44	5,834	5,976	11,810	48	−37	11
45-49	4,564	4,838	9,402	64	−7	57
50-54	2,745	3,133	5,878	77	1	78
55-59	4,415	5,432	9,846	118	20	138
60-64	3,005	4,086	7,090	95	42	137
65-69	2,967	4,777	7,744	108	18	126
70-74	1,236	3,167	4,403	26	20	46
75-79	616	1,864	2,480	7	23	29
80-84	449	1,663	2,111	1	5	6
85-89	162	720	882	1	1	1
90-94	31	182	213	−10	−28	−38
95-99	6	38	44	0	15	15
Total	70,985	79,489	150,473	1,599	1,108	2,707
5-99				613	127	740
male 20-59				461		

Note : The author's calculations.

million.

Calculating child and elderly dependency ratios based on the estimated population and the international standard system, we obtain 33.4 and 18 respectively. Comparing the official data in Table 12.13 with these estimates, the child dependency ratio estimated is higher than the official ratio in Table 12.3, while the elderly dependency ratio estimated is near the official data. Employing the quasi-Russian system, the elderly dependency ratio accounts for 35. This is also near the recorded value. Therefore, it can be stated that our estimate does not influence the understanding of the elderly dependency ratio. In other words, the effect of the crisis in the 1990 s in our

estimate can be found only in the child dependency ratio.

The drawback of a simple cohort component method is to receive the influence of the demographic migration shift strongly. The 5-14 yrs population in the official data is larger than that in our estimate. A large population inflow of this age group for 1990-1995 would explain the difference. The reason why the estimate is far greater than the official value for both sexes of 20-24 yrs age group may be attributed to the fact that a large number of this age group left Russia for 1985-1990. For 30-34 yrs males and 30-44 yrs females, it may be presumed that the inflow of these age groups for 1990-1995 was large.

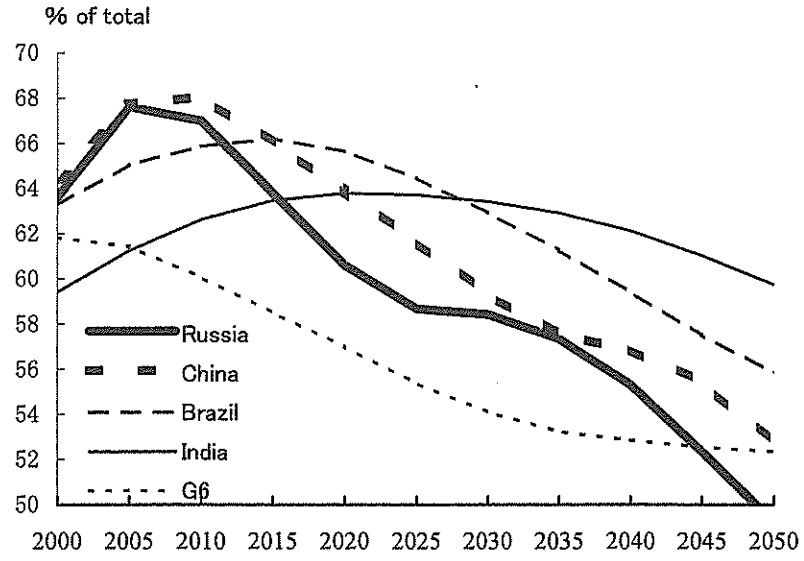
We could not make full use of the Russian time-series data on demographic migration by sex and age in the estimation, which made us difficult to eliminate the effect of migration shifts from our estimation. This is a remaining issue. We simply presented an estimate as a reference for further studies.

12.7 Conclusion : How can we dream with Russia ?

We clarified some aspects of Russia's population crisis in the 1990 s or its early transition period (times of stress) in the light of the long run perspectives shown by the demographic paths to 2050. We provided a new estimate of male's premature deaths in the 1990 s in Russia, presenting an estimate of the 1995 population based on cohort component method. We partially employed future population projections based on the 2002 census, which made pessimistic forecasts of the population path to 2050 relax to some extent. However, it can be stated that possible revisions of the projections for 2006-2050 would not bring about markedly better paths to 2050. Thus it is rather difficult to dream with Russia.

A shrinking population would hamper Russia's growth perspectives. Nevertheless, a Goldman-Sachs report (Wilson and Purushothaman, 2003) presented a world of "dreaming with BRICs (Brazil, Russia, India and China)". This report showed that Russia would continue to grow at an annual average rate, 3% and overtake Italy, France, and Germany completely from the view point of GDP in the U. S. dollars by 2030. This report seems to be rather academic because it explicitly shows data sources and methodology for their

Figure 12.9 Working-Age Population Projected to Decline in BRICs and G6



Working age population: age 15-59.

Notes : Compiled by U. S. Census Bureau, *International Data Base*.
See Wilson and Purushothaman, 2003, p. 8.
Working age population : aged 15-59.

projections.

The report employs BRICs population projections made by the U. S. Bureau of the Census (U. S. Bureau of the Census, *International Data Base*, 2004). These projections rightly reflect Russia's long run depopulation. In fact, Russia's population projected by the U. S. Bureau of the Census is 130 millions in 2025 and 110 millions in 2050, which are near the results of the UN 2004 revision. In addition, as is shown by Figure 12.9, the report also rightly projects that Russia's working-age population share will show an increase until 2010 but then a marked decline in the long run along with China.

The report employs a simple macro production function, namely $Y=AK^{\alpha}L^{1-\alpha}$ for their growth projections, where the variable L indicates the working-age population share. This means that the report projects Russia's sustainable growth with decreasing L. When disregarding arbitrary assumptions concerning the technological progress, the report suggests that the long run population crisis would not necessarily mean a long run economic crisis. We should

develop further the comprehensive economic analysis of Russia, including a reappraisal of the validity of the report. As is well known, due to high world oil prices, Russia has witnessed favorable economic growth for 2000-2005 better than that projected by the report. As is also now well known, it is rather difficult to understand the development in Russia's oil and gas sector because of peculiarities of the Russian economy (Kuboniwa *et. al.*, 2005). As the Russian economy has heavily relied on the oil and gas sector, its sustainable growth still remains a remarkably debatable issue. This problem should be investigated in association of projections of population and technological progress, as was performed by the Goldman-Sachs report.

Endnotes

1. This chapter is a revised version of my paper (Kuboniwa, 2005), partially employing recent estimates for 2005-2050 updated by the United Nations and the Russian Statistical Office (Rosstat, former Goskomstat) after the Russian 2002 census.
2. Data sources for Fig. 1 : GDP : *RSE* various issues for 1991-2004 and http://www.gks.ru/for 2005. Birth-death ratios : *RSE*, 2004, p. 100, *SEP*, 2005, No. 1, p. 269, Pension : Table 8.1.
3. As a basic index of population crisis, we employ birth-death ratio. (B/D ; B=number of births, D=number of deaths). As a surrogate index for the usual natural growth index ($=B-D$) use of $ln\ B-ln\ D=ln\ (B/D)$ is rational. Therefore, monotonicity of $ln\ (\cdot)$ makes it possible to use B/D as a surrogate index as well. Here number of births/number of deaths=crude birth rate/crude death rate.
4. Data sources for Fig. 12.3 : *DER, RSE* various issues and *Predpolozhitel' naia*...2002.
5. Data sources for Fig. 12.4 : *DER*, 2001, p. 55, *Predpolozhitel'naia*...2002, p. 113.
6. Data sources for Fig. 12.5 : *DER*, 2001, p. 55 and *UN*, 2001 a, p. 338.
7. Data sources for Fig 12.6 : *DER*, 2001, p. 94, *Predpolozhitel'naia*...2002, p. 132.
8. Data sources for Fig. 12.8 : *UN*, 2001 a, Table A.35, Corrigendum. It should be noted that all elderly dependency ratios in the published text of this UN report were misprinted. We made corrections by using errata attached to the report.
9. When the UN data (medium variant) is employed, the elderly dependency ratios, based on a quasi-Russian standard difined as ((number of male 60+

and female 55+)/(number of (male 15-59 and female 15-54)×100), were estimated to be 33.5 for 2000, 41 for 2015 and 89.2 for 2050. The ratios for the years 2000 and 2015 are not so much different from those of Rosstat. However, for the year 2050, the UN forecast is far from the Rosstat prospect. This was due to the fact that the UN forecasted Russia's life expectancy longer than Rosstat.

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