Russia Faces Depopulation? Dynamics of Population Decline

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Between 1992 and 1993 Russia's population declined, as it has in every succeeding year. This has been viewed as a population disaster, related to high adult male mortality and deterioration of the health care system. Some see a substantially depopulated Russia in the future. However, the prospect of long-term population decline is completely due to recent declines in fertility. High adult male mortality, although a cause of great concern, does not contribute to the chance of long-term population decline. Projections of the future population of Russia depend upon the exact fertility assumptions used. Based on the example of fertility in the United States in the Great Depression and the Baby Boom following World War II, the future depopulation of Russia is far from certain.

KEY WORDS: fertility decline; mortality increase; population reproduction; developed countries; New Independent States.

INTRODUCTION

Since the collapse of the Soviet Union in 1991, there has been great interest in demographic changes in Russia and in whether these changes are a direct result of political events. Concerns about a future depopulated Russian state have fueled headlines in the popular press as well as scholarly writings (Antonov, 1999; Baiduzhy, 1994; Breev, 1998). Grim forecasts have been linked to reports of high adult male mortality from excess drink-

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ing and to the deterioration of the health care system, as indicated by an increase in tuberculosis, diphtheria, and other dread diseases (cf. Feshbach, 1995; Rutkevich, 1996). The visibility of Russian immigrants in many parts of the world also supports a view of people fleeing disaster (Lewin-Epstein et al., 1997).

Two different kinds of questions can be asked about recent population processes in Russia. Why has the growth rate of the population of Russia has become so low since 1991, and what can we say about the growth trajectory for the future? What population patterns in Russia are unusual and what can explain them?

RUSSIA AND THE FORMER SOVIET UNION

Russia is commonly considered the successor to the Soviet Union. Russia (the Russian Soviet Federated Socialist Republic) was the largest of the fifteen union republics that constituted the Soviet Union. Although most people in Russia were ethnic Russians, the population of Russia and the ethnic Russian population of the Soviet Union were not identical.

Table 1 shows the total population of the Soviet Union, of Russia, and of the remainder of the Soviet Union at the time of the last Soviet census in 1989. It also shows the composition of the population of these areas according to how many were ethnic Russians and how many were not ethnic Russians. Non-Russians included members of many different ethnic groups, such as Ukrainians, Estonians, Georgians, and Koreans (Anderson & Silver, 1989).

In 1989, Russia comprised 51% of the population of the Soviet Union. The change from a Soviet Union with a population of more than 280 million to the Russian Federation with a population of less than 150 million by itself can be seen as a substantial population decline.

TABLE 1

Population of the Soviet Union by Region and by Ethnicity, 1989

	Soviet Union	Russia	Not Russia
Population in Millions	285.7	147.0	138.7
Ethnic Russians	145.1	119.8	25.3
Ethnic non-Russians	140.7	27.2	113.4

This paper takes an historical and comparative approach to put changes in the population of Russia in perspective. The experience of Russia since the 1950s is compared with that of four other countries: Hungary, the United States, Italy, and France. Like Russia, Hungary is a former state socialist country, but one that formally broke its ties with state socialism in 1989–90. The United States is an appropriate comparative case due to its familiarity to American readers, its status as the last superpower, and its high growth rate among developed countries. Italy and France are Western European countries that share many characteristics with other European states. Italy has the distinction of having perhaps the lowest total fertility rate of any country at the end of the twentieth century. France has long worried about the threat of depopulation (Chantrel, 1994; Huss, 1990; Spengler, 1938).

This paper concentrates on population dynamics across five-year time periods. Data for five-year periods are more readily available than those for single years. Focussing on five-year periods also avoids devoting excessive attention to short-term fluctuations. There is some discussion of changes related to single years when such changes are of special interest. The data for Russia in this paper refer to the population within the geographic limits of the Russian Federation, even though in the Soviet period Russia was part of the Soviet Union.

Data and the related discussion have been extended as close to the present time as possible. Consistent data are available through 1990–94. Consistent and reliable data for 1995–99 and for 2000 are much more difficult to locate. As described in the Appendix, some of the measures for 1995–99 for a particular country are based on the measure for a single year, such as 1997. Thus estimates for 1995–99 are likely subject to more error than for those for somewhat earlier periods.

The prospect of substantial population decline has been forecast before with presumed certainty for many countries. Spengler wrote in 1938:

> Within the next quarter century true depopulation—a persistent long-run excess of deaths over births—will manifest itself in nearly all the countries of Europe and in those non-European countries to which Western civilization has spread. (Spengler, 1938, p. 3)

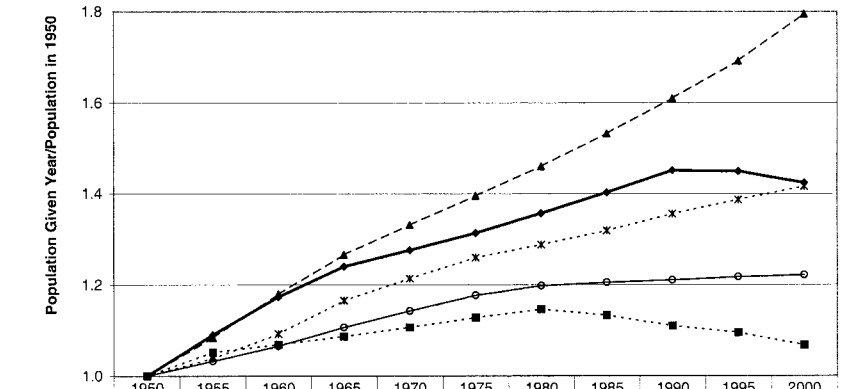
By 1965–69, a quarter of a century after the above was written, the more-developed regions of the world had a natural rate of increase of 8 per 1000 population (United Nations, 1999a, p. 10), and France had a natural rate of increase of 6 per 1000 (United Nations, 1999a, p. 190). In 1943,

the demographers Warren Thompson and P. K. Whelpton forecast that the population of the United States would begin to decline after peaking in 1985 (Davis, 1948, p. 608). These historical precedents should caution people not to be too certain about the future depopulation of Russia.

POPULATION GROWTH 1950–2000

What has been the recent history of population growth in Russia? Between 1990 and 1995, the population of Russia decreased, with the change from population growth to population decline occurring between 1992 and 1993. Between 1995 and 2000, Russia's population decreased further; in 2000, the population was virtually the same size as it had been in 1987.

How does this trajectory compare to that of other countries? Figure 1 shows for Russia and for each of the other four countries the total population relative to that country's population in 1950. In 2000 the population of Russia was 1.42 times its value in 1950. Among the five countries, the United States experienced the greatest proportionate population growth. France overall had a similar experience to Russia, and Italy and Hungary have grown more slowly. Since 1985 the population of Hungary has declined, and the population of Italy has remained virtually unchanged. Until



	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000
Russia	1.000	1.090	1.173	1.240	1.276	1.314	1.357	1.403	1.451	1.449	1.424
Hungary	1.000	1.052	1.069	1.087	1.107	1.128	1.147	1.133	1.110	1.095	1.067
USA	1.000	1.084	1.180	1.266	1.331	1.395	1.460	1.533	1.610	1.692	1.795
Italy	1.000	1.032	1.066	1.106	1.143	1.177	1.198	1.205	1.211	1.217	1.221
France	1.000	1.038	1.092	1.166	1.214	1.260	1.288	1.319	1.356	1.387	1.416

FIGURE 1. Population size relative to 1950.

the 1990s the rate of population growth in Russia was greater than any of these countries except the United States. Thus, population decline in Russia is a very recent phenomenon.

COMPONENTS OF POPULATION GROWTH

The change in the size of a country's population is a balance between the number of births in excess of deaths and the number of migrants into the country in excess of the number of migrants out of the country. This is described by the population balancing equation, in which:

$$P_2 = P_1 + B - D + I - O$$

where:

P_2 = Population at Time 2
P_1 = Population at Time 1
B = Births between Time 1 and Time 2
D = Deaths between Time 1 and Time 2
I = Immigrants between Time 1 and Time 2
E = Emigrants between Time 1 and Time 2

In rates per 1000 population, this is expressed as:

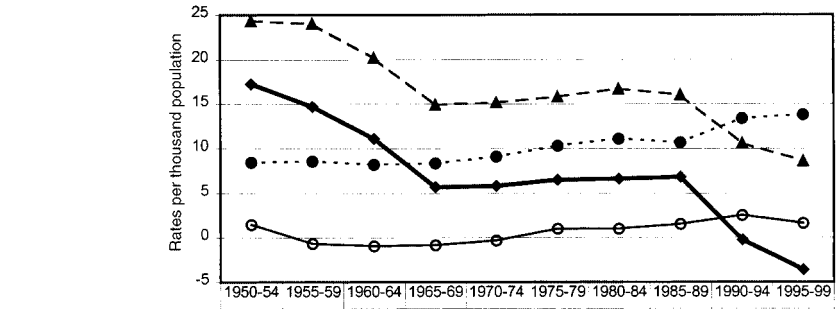
$$GR = CBR - CDR + Immig - Emig$$

where:

GR = Growth Rate between Time 1 and Time 2
CBR = Crude Birth Rate2 (Births per 1000 population) between Time 1 and Time
CDR = Crude Death Rate (Deaths per 1000 population) between Time 1 and Time 2
Immig = Gross Immigration Rate (Immigrants per 1000 population between Time 1 and Time 2)
Emig = Gross Emigration Rate (Emigrants per 1000 population between Time 1 and Time 2)

The overall contribution of migration to population growth can be expressed as the net immigration rate, which is the gross immigration rate minus the gross emigration rate. In other words, it is the net number of immigrants per 1000 population of the country.

Figure 2 shows the values of the crude birth rate, the crude death rate,



	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99
Growth Rate	17.3	14.7	11.1	5.7	5.8	6.5	6.6	6.8	-0.3	-3.6
Crude Birth Rate	24.3	24.0	20.2	14.9	15.2	15.8	16.7	16.0	10.6	8.6
Crude Death Rate	8.5	8.6	8.2	8.4	9.1	10.3	11.1	10.7	13.4	13.8
Net Immigration Rate	1.5	-0.7	-0.9	-0.8	-0.3	1.0	1.0	1.5	2.5	1.6

FIGURE 2. Components of population growth in Russia—rates per thousand population.

and the net immigraton rate for Russia for each five-year period between 1950 and 2000.[1] The overall growth rate is also shown. All of these are crude rates, unadjusted for the age composition of the population.

The net immigration rate is not observed directly. Rather, it is calculated as the difference between the growth rate and the natural rate of increase. The natural rate of increase is the crude birth rate minus the crude death rate. Since the net immigration rate is the residual from directly measured data on population size, births, and deaths, it is subject to whatever errors are in those measures. Thus, small fluctuations in the net immigration rate can be the result of error in its components.

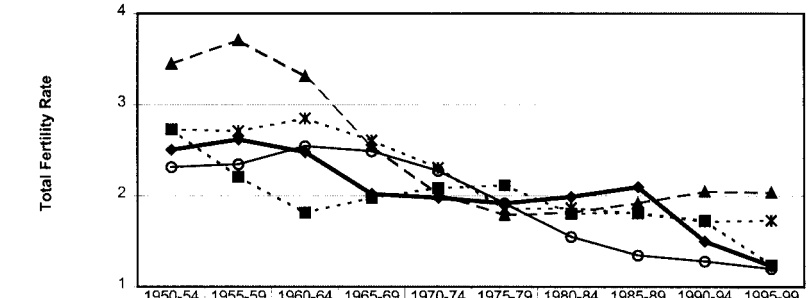
It is interesting to see how the various components of population growth in Russia have changed over time. The crude birth rate declined steadily, with especially rapid declines in the late 1950s, the early 1960s and the 1990s. The crude death rate has generally increased. The crossing of the lines for the crude birth rate and the crude death rate in the early 1990s is striking. Between the late 1980s and the late 1990s, the crude birth rate declined by almost half (8.6/16.0 = .54), while, the crude death rate increased by less than one-third (13.8/10.7 = 1.29). It is clear even from the change in crude rates that fertility decline played a larger role in population decrease in Russia in the1990s than did mortality increase. Some may find the positive values of the net immigration rate in the 1990s surprising. In some parts of the former Soviet Union, such as Estonia, net emigration has contributed substantially to decline in population size in the

1990s.[2] However, on balance, people have not been fleeing Russia. Next we will consider in more detail what was happening in the areas of fertility, mortality, and migration in order to understand the dynamics behind this recent change in growth in Russia.

FERTILITY

Figure 3 shows the total fertility rate (TFR), which is the number of births a woman would have if she went through her life having children at the rates by age that occurred in the population in the given time period. This measure controls for the age distribution of women. In relatively low mortality countries, which includes all of the five countries considered in this paper, a TFR of slightly greater than 2.00 is necessary to maintain population size. The TFR necessary to maintain population size in the long run is called the replacement fertility level.

Modern fertility control only became in evidence throughout Russia after World War II (Coale et al., 1979). The TFR declined to replacement level in the late 1960s. After that, Russia's TFR fluctuated around its replacement level, with some increase in the late 1980s, before declining sharply in the 1990s. Some scholars see the increase in fertility in Russia in the 1980s as a temporary phenomenon and the recent fertility decline as the continuation of a long-term trend (Kharkova & Andreev, 2000).



	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99
Russia	2.51	2.62	2.48	2.02	1.98	1.92	1.99	2.10	1.50	1.23
Hungary	2.73	2.21	1.82	1.98	2.09	2.12	1.81	1.82	1.73	1.24
USA	3.45	3.71	3.31	2.55	2.02	1.79	1.82	1.92	2.05	2.04
Italy	2.32	2.35	2.55	2.49	2.28	1.92	1.55	1.35	1.28	1.20
France	2.73	2.71	2.85	2.61	2.31	1.86	1.87	1.81	1.72	1.73

FIGURE 3. Total fertility rate.

In Hungary the TFR declined somewhat earlier than in Russia. The Hungarian TFR declined from the mid-1970s, and by the late 1990s the TFR in Hungary and the TFR in Russia were virtually identical.

The high value of the TFR in the United States in the 1950s and 1960s is striking. This was the period of the Baby Boom. Many developed countries have been envious of the continued relatively high fertility in the United States.

Italy has experienced a sustained decline in the TFR since the 1960s. At a more gradual pace, this has also been true of France. Sustained low fertility in Europe and in Japan has been a source of increasing concern on the part of governments and analysts (Ueno, 1998; United Nations, 1999c). Echoing Spengler's earlier concerns, some scholars think that below replacement fertility could be a distinguishing characteristic of developed countries (Chesnais, 1995).

What are the causes of the decline in the TFR in Russia in the 1990s? Part of the reason for the decline in the TFR was a shift in the timing of fertility, and part was reduced fertility, almost certainly due to worsened economic conditions in Russia.

As shown in Figure 3, the TFR in Russia increased in the 1980s. This increase was related to pro-natalist policies of the Soviet government, including paid maternity leave, which over time was extended from one year to three years, and the implementation of a definition of a large family as one with at least three children. If a family was "large," it qualified for a variety of housing and social service benefits. Zakharov and Ivanova (1996) show that the application of these policies was related to an increase in the pace of childbearing in the 1980s. Some women had second and third births in the 1980s who earlier would have stopped after one or two children. Some women who had children in the 1980s otherwise would have postponed having those children into the 1990s. In the late 1980s, the total fertility rate for first births was greater than 1.00, which means that both earlier and later cohorts were having their first births at the same time (Zakharov & Ivanova, 1996). Since cohorts in the childbearing ages in the 1980s have not yet completed their childbearing, it is not yet possible to determine how much of the fertility decline in the 1990s is the result of the shift of childbearing to earlier ages in the 1980s.

Economic Conditions and Fertility Change

Following the dissolution of the Soviet Union, economic conditions in Russia substantially worsened. The GNP per capita for Russia fell from $4070 in 1989 to $2240 in 1995 (United Nations Development Program,

1998, p. 212). After many years of decline, the gross domestic product in Russia began to grow in 1999 (World Bank, 2001). Much of the rapid decline in fertility in Russia almost certainly is in response to economic difficulties. As has been noted by others, there are numerous reasons why the 1990s would not have seemed to be an auspicious time to have a child (Avdeev & Monnier, 1994; Ranjan, 1999).

What do we know about the responsiveness of childbearing to economic change? In a situation in which there is effective fertility regulation, women and couples can choose to increase or decrease their fertility. In historical populations, fertility has often declined after an increase in the price of food (Lee, 1990). The responsiveness of fertility to food price is especially noticeable in France, which adopted widespread fertility limitation before any other Western country (Richards, 1984). Fertility typically rebounded shortly after conditions improved. The crisis and famine in China 1958–61 was accompanied by a large fertility decline followed by increased fertility (Ashton et al., 1984). Peracca (2001) found that the economic crisis in Thailand in 1997–98 was related to an increased willingness to abort an unwanted pregnancy. Palloni et al. (1993) found some evidence that a decrease in GDP per capita was associated with a decline in fertility in several Latin American countries, especially after 1955.

Fertility in the United States in the Great Depression, World War II, and the Baby Boom

One of the best-known cases of fertility decline in response to economic problems followed by fertility increase once the economy has improved is that of the United States in the Great Depression, World War II, and the Baby Boom. Figure 4 shows the TFR in the United States for each five-year period 1920–24 through 1955–59. The TFR was 3.18 in 1920–24 and dropped to 2.18 in 1935–39—a decline to 69% of the level in the mid-1920s. With World War II and the ensuing post-War prosperity, fertility increased, until by 1955–59 the TFR was 3.61—an increase of 66% from 1935–39.

It has often been noted that a substantial part of fertility decline with the Great Depression and the subsequent fertility increase was a result of timing. This is indicated by considerably smaller fluctuations in cohort fertility than in period fertility (Ryder, 1986). Figure 4 shows cohort TFR values centered on the date for which the cohort was age 30, which is about the mean age of childbearing. The more moderate swings in cohort fertility than in period fertility are clear. Total fertility for the cohort that was age 30 in 1920–24 was 2.93, and dropped to 2.29 for the cohort age 30 in

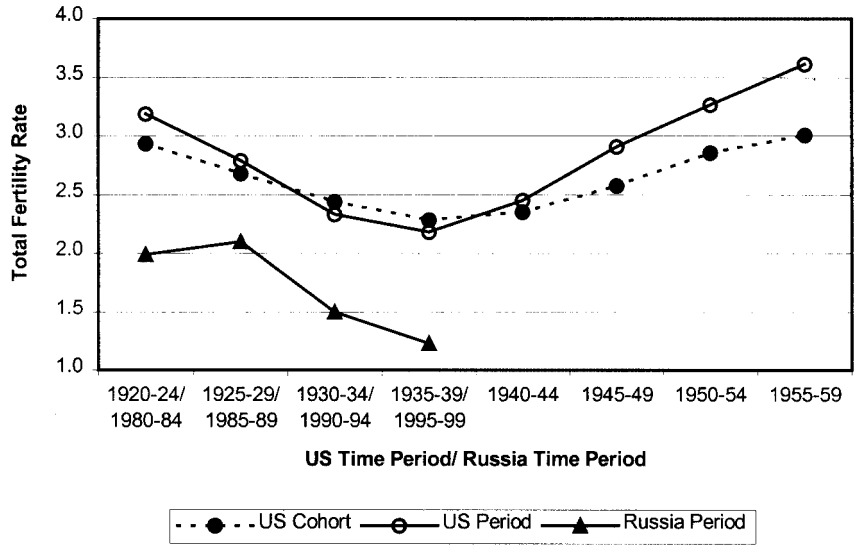


FIGURE 4. United States cohort and period total fertility rates, 1920–59 and Russia period total fertility rates, 1980–99.

1935–39—a decline to 78% of the value for the cohort that was age 30 in the mid-1920s. Cohort fertility was 3.01 in 1955–59—an increase of 31% over its value for 1935–39. Thus, women who were in prime childbearing ages during the Great Depression postponed much of their childbearing until better times.

Figure 4 also shows period TFR in Russia for 1980–84 through 1995–99. The value for 1995–99 for Russia—the low point for fertility in Russia in the recent past—appears at the same place on the horizontal axis as the value for the United States for 1935–39—the low point of Depression-era fertility. The TFR in Russia in the 1980s and 1990s was lower than the TFR in the United States in the 1920s and 1930s. However, the lines are almost parallel.

Since fertility declined so sharply in Russia, it seems more likely that economic improvements will result in increased fertility there than in countries such as Italy and France which experienced a long-term, gradual fertility decline. Both France and Italy have implemented a variety of pro-natalist policies, with limited success. In recent years, in neither country has fertility limitation been strongly related to the state of the economy (Calot, 1997).

The period 2015–19 will be twenty years after 1995–99. If in those

twenty years the TFR in Russia rises to 66% above its 1995–99 value—paralleling the increase in United States TFR between 1935–39 and 1955–59—it would be 2.04, which is almost exactly at replacement fertility. It is unlikely that fertility in Russia in the twenty-first century will parallel that in the United States in the 1940s and 1950s, but the historical example of the United States indicates that substantial increase in fertility in Russia is possible.

MORTALITY

The level of the TFR necessary to maintain population size depends on the level of mortality. The higher mortality, the higher a TFR is needed for the population to replace itself. The TFR can be converted into the gross reproduction rate (GRR), which is the number of daughters that a woman would have if she went through her life having daughters at the rates at each age in the given population. Both the TFR and the GRR express the level of childbearing without taking mortality into account. If half of all women died before they reached age 15 and the other half survived past age 50, then a GRR of 2.00 would be needed for each woman to replace herself with one daughter.

The net reproduction rate (NRR) is the GRR modified by mortality. If all women survived through the childbearing ages, then the NRR and the GRR would be equal. Zero population growth in the long run occurs when NRR = 1.00. A population may have NRR = 1 but actually be increasing or decreasing for some time, due to the age distribution. However if NRR = 1, then each woman is replacing herself with one surviving daughter.

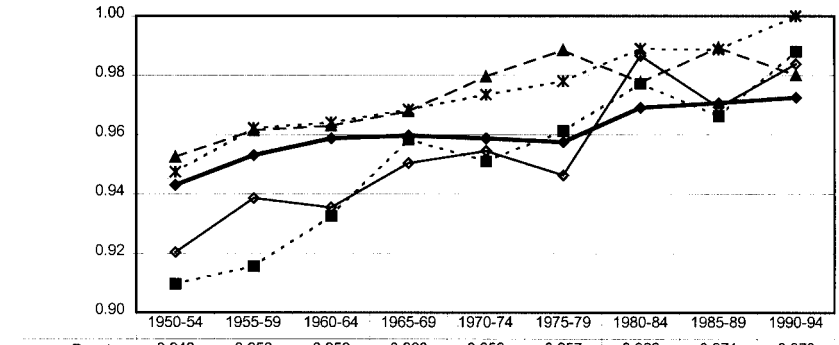
Table 2 shows the NRR in the five countries in each five-year period 1950–54 through 1990–94. Values of the NRR for 1995–99 are not available from a reliable source at the present time. The NRR in Russia has been less than 1.00 since the mid-1960s. The NRR in Hungary was less than 1.00 since the mid-1950s, in the United States since the 1970s, and in Italy and France since the mid-1970s. If we view an NRR of .9 or greater as close to replacement level, Russia was close to replacement level through the 1980s. Italy has been substantially below replacement since the mid-1970s. The United States was substantially below replacement from the mid-1970s through the mid-1980s, but by the 1990s was very close to replacement level.

The gap between the GRR and the NRR is a measure of the influence of mortality on long-term population growth, which is often called population reproduction. Figure 5 shows the NRR divided by the GRR. The higher

TABLE 2

Net Reproduction Rate in Five Countries, 1950–1994

	1950–54	1955–59	1960–64	1965–69	1970–74	1975–79	1980–84	1985–89	1990–94
Russia	1.16	1.22	1.16	.95	.93	.90	.94	.99	.71
Hungary	1.21	.99	.83	.92	.90	.99	.86	.86	.83
USA	1.60	1.74	1.56	1.20	.96	.86	.87	.92	.98
Italy	1.04	1.07	1.16	1.15	1.05	.88	.74	.63	.61
France	1.26	1.27	1.34	1.23	1.10	.89	.90	.87	.83



	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94
Russia	0.943	0.953	0.959	0.960	0.959	0.957	0.969	0.971	0.973
Hungary	0.910	0.916	0.933	0.958	0.951	0.961	0.977	0.966	0.988
USA	0.952	0.961	0.963	0.968	0.980	0.989	0.978	0.989	0.980
Italy	0.920	0.939	0.935	0.950	0.955	0.946	0.987	0.969	0.984
France	0.947	0.962	0.964	0.969	0.973	0.978	0.989	0.989	1.000

FIGURE 5. Net reproduction rate/gross reproduction rate.

the value of this ratio, the less population reproduction is reduced by mortality. In 1990–94, to three decimal places this ratio for France was 1.000. Although some women in France in the 1990s died before they reached age 50, the proportion was so small as to have a negligible effect on long-term population growth. When this ratio increases over time, it means that changes in mortality rates are leading to a higher rate of population growth, given age-specific fertility rates.

If increases in mortality contributed to long-term population decline in Russia, then the values for Russia in Figure 5 would decline over time. Since the mid-1970s this ratio has steadily risen in Russia. Thus, changes in age-specific death rates in Russia overall have not only not contributed to a decline in population growth but have led to a higher rate of population growth than would have occurred if age-specific death rates had remained unchanged. In 1990–94, female mortality in Russia was so low through the childbearing ages that if no women had died before age 50, the TFR would have been only 2.8% higher—that is, TFR would have been 1.54 rather than 1.50.

Looking back at Figure 2, it may seem ridiculous to claim that increased mortality was not a source of population decline after 1990, since the crude death rate increased sharply. However, the crude death rate is not adjusted for the age distribution of the population. In addition, the NRR measures the tendency to population growth and decline in the long run,

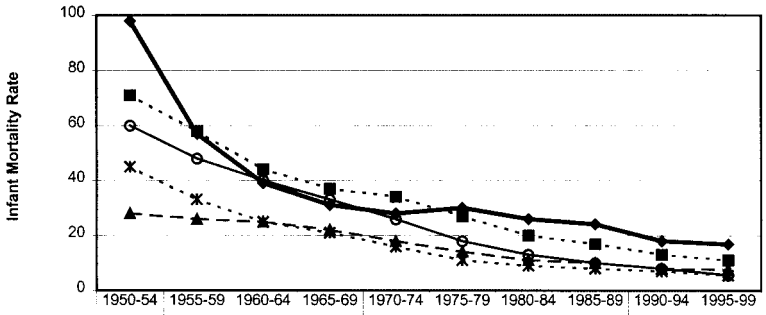
while short-term fluctuations in population size may result from a variety of sources.[3]

Feshbach (1995) and Rutkevich (1996) attribute population decline in Russia partially to increases in mortality. This is true only in a very narrow sense. Although increases in mortality in Russia are serious, especially for older men, they are not a cause of population decline in Russia in the long-term since they did not contribute to a widening in the gap between the NRR and the GRR. As we shall see in the next sections of this paper, mortality changed in very different ways in Russia for different age groups and for men compared to women. If all men and women died at age fifty, it would be a social tragedy, but it would have no effect on the gap between the GRR and the NRR and would have no effect on long-term population growth.

Infant Mortality

Infant mortality is closely related to population growth. If a child dies shortly after birth, the effect on population growth is as if the child had never been born. The infant mortality rate (IMR) is the number of babies who die before they reach their first birthday out of every 1000 births.

Figure 6 shows IMR for each five-year period 1950–1999. The IMR has declined in all five countries. The IMR in Russia increased from 28 in 1970–74 to 30 in 1975–79, but this was mainly due to changes in the



	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99
Russia	98	57	39	31	28	30	26	24	18	17
Hungary	71	58	44	37	34	27	20	17	13	11
USA	28	26	25	22	18	14	11	10	8	8
Italy	60	48	40	33	26	18	13	10	8	6
France	45	33	25	21	16	11	9	8	7	6

FIGURE 6. Infant mortality rate.

application of the definitions of a live birth and an infant death (Anderson & Silver, 1986a, 1997, 1999; Blum & Monnier, 1989). Looking at values for five-year periods, the IMR in Russia continued to decline after 1990, although the IMR did increase from 1992 to 1993. Thus, despite the economic problems in Russia in the 1990s, there was little long-term effect on the IMR.

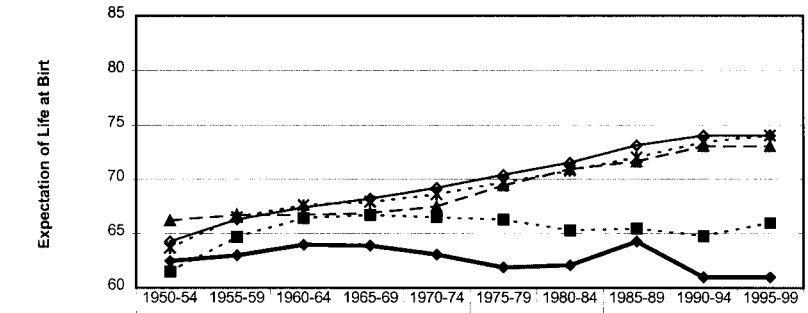
It is surprising that no substantial, sustained increase in the IMR in Russia is apparent, since along with the general worsening of the economic situation in the 1990s, the amount of inequality increased greatly. Russia had a Gini coefficient for income of .27 in the late 1980s that rose to .41 in 1993–94. Also the ratio of the income of the richest 10% of the population to that of the poorest 10% of the population was 3.16 in the late 1980s and 15.10 in 1993–94 (United Nations Development Program, 1998, p. 222). Due to the overall worsening of the economy and increased inequality, the proportion of the population in poverty rose. The incidence of some diseases rose, reflecting increased vulnerability of a portion of the population. For example, the number of diphtheria cases per 100,00 population in Russia increased from .8 in 1990 to 10.3 in 1993 (National Center for Health Statistics, 1995, p. 13). Of course, if economic conditions had not worsened, the IMR might have declined further. A major reason why Figure 5 showed an increase in the NRR/GRR for Russia from the late-1980s to the early 1990s is that the IMR generally continued to decline.

Expectation of Life at Birth and Rising Adult Male Mortality

Even though increases in mortality did not contribute to long-term population decline in Russia, high and rising adult male mortality is a serious negative feature of recent population patterns in Russia. Figures 7 and 8 show expectation of life at birth for males and for females. The expectation of life at birth is the number of years a person would live if exposed to the age-specific death rates in a population in a given period of time.

In the United States, Italy, and France, male expectation of life at birth has steadily increased in the last fifty years. In Russia and Hungary, male expectation of life at birth increased into the 1960s and then generally decreased. The decrease after the 1960s in both Russia and Hungary was due to increases in the death rates above age 40.

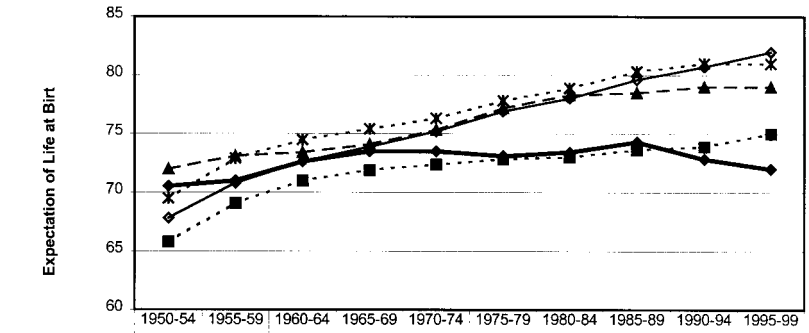
After World War II, age-specific death rates for older adult males increased in many Western countries, or did not improve commensurate with mortality improvements for females and for younger males, mainly due to the effects of increased male cigarette smoking (Preston, 1970). In most countries increases in age-specific death rates at the older ages were not



	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99
Russia	63	63	64	64	63	62	62	64	61	61
Hungary	62	65	66	67	67	66	65	66	65	66
USA	66	67	67	67	68	69	71	72	73	73
Italy	64	66	67	68	69	70	72	73	74	74
France	64	67	68	68	69	70	71	72	73	74

FIGURE 7. Expectation of life at birth for males.

sufficient to lead to a decline in male expectation of life at birth. However between the late 1950s and the late 1960s, the probability that a male alive at age 40 would survive to his sixtieth birthday declined in many developed countries, including Russia and the other republics in the European part of



	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99
Russia	71	71	73	74	74	73	73	74	73	72
Hungary	66	69	71	72	72	73	73	74	74	75
USA	72	73	73	74	75	77	78	79	79	79
Italy	68	71	73	74	75	77	78	80	81	82
France	70	73	75	75	76	78	79	80	81	81

FIGURE 8. Expectation of life at birth for females.

the Soviet Union, Czechoslovakia, Yugoslavia, the Netherlands, Luxembourg, Denmark, Norway, Iceland, Finland, New Zealand, Northern Ireland, and Australia. This survival probability also declined between the late 1960s and the late 1970s in the European republics of the Soviet Union and in all the Eastern European countries except Yugoslavia, as well as in Denmark (Anderson & Silver, 1986b, pp. 204–205, 1994). For females in Russia, after the mid-1960s, expectation of life at birth was virtually unchanged until the 1990s when there was some decline.

In Russia, for both males and females, cardiovascular mortality was a major cause of mortality deterioration or lack of improvement, concentrated in the 40–59 age group (Shkolnikov et al., 1997). Cardiovascular mortality is related to smoking, especially for males. Lopez (1997) estimates that in 1990, 30% of all male deaths and 42% of male deaths age 35–69 in Russia were due to smoking.

Alcohol consumption and violence were also important for these adult mortality trends, especially for men. Shkolnikov and Mesle (1996, p. 125) show that the male standardized death rate age 15–64 for Russia was 578 per 100,000 in 1965 and 1003 per 100,000 in 1993. The standardized rate from all circulatory diseases went from 155 in 1965 to 346 in 1993, and the rate for all external causes (violence and accidents) went from 150 in 1965 to 347 in 1993.

The striking exception to the trend in decreasing male expectation of life at birth in Russia is the increase in male life expectancy in the late 1980s. This rise can be totally attributed to a decrease in male deaths as a result of the implementation of the Gorbachev anti-alcohol campaign in 1985–86. After this campaign stopped, male death rates again rose, and expectation of life at birth fell. The campaign began to fall apart in 1988, when Soviet state production of alcohol increased. The anti-alcohol campaign was abandoned partly because of governmental concern over the reduction in state revenues from taxes on alcohol (Treml, 1997).

The decrease in male death rates in the late 1980s was almost totally accounted for by decreases in death rates from injury and poisoning. Many injury deaths were related to intoxication. Poisoning was typically alcohol poisoning, which was caused not by contaminated liquor but by consuming so much alcohol so fast that the person was poisoned.

The anti-alcohol campaign worked by restricting access to alcoholic beverages. Although the production of home brew certainly increased, it was not enough to offset the effects of diminished legal supply (Shkolnikov et al., 1997; Shkolnikov & Nemtsov, 1997). Shkolnikov and Nemtsov (1997, p. 243) estimate that total annual alcohol consumption in Russia (in liters of pure ethanol per capita) was 14.2 liters in 1985, dropped to 10.6 in 1986,

was 10.7 in 1987, rose to 11.2 in 1988 and by 1993 at 14.5 surpassed its level in any earlier year. It was possible for Soviet policy to restrict alcohol consumption because alcohol production was a state monopoly. After the collapse of the Soviet Union and the opening of the market, restriction of the supply of alcoholic beverages in a manner similar to that in the Gorbachev campaign was a practical and political impossibility.

Many people have assumed that deterioration in medical care or in the public health system played a role in the decline in male expectation of life at birth in the 1990s generally and especially from 1992 to 1993 when male expectation of life at birth declined precipitously. There have been numerous reports of deterioration of curative health care services, especially in public facilities (Barr & Field, 1996; Field, 1995; Rozenfeld, 1996). When one thinks of deterioration in public health, one envisages a decline in sanitation and an increase in deaths from infectious and parasitic causes.

If deterioration either in curative medical care or in sanitation were a major source of the decline in male life expectancy, one would expect an increase in mortality from infectious and parasitic causes and/or an increase in the mortality of the young, who are very vulnerable. We have seen that although the IMR increased briefly, there was not a sustained increase in the IMR. Also, increases in infectious and parasitic causes of death played a miniscule role in the increase in adult male mortality.

In Russia the male standardized death rate for those age 15–64 from infectious and parasitic diseases declined from 48 in 1965 to 25 in 1993 (Shkolnikov & Mesle, 1996, p. 125). Of the decrease in male expectation of life at birth of 3.06 years from 1992 to 1993—a decline from 62 years to 59 years—the contribution of changes in deaths from injury and poisoning accounted for 1.28 years of this decline, and changes in mortality from cardiovascular diseases accounted for 1.09. Changes in deaths from infectious and parasitic diseases accounted for only .12 years of this decline (Shkolnikov & Mesle, 1996, pp. 116, 137). Thus, deterioration in curative medical care or the public health system as conventionally viewed were not major causes of the decline in male expectation of life at birth, a conclusion also reached by Chen et al. (1996).

Russia has the largest gap between female and male expectation of life at birth of any country in the world. In 1993, out of a difference of 13 years between male and female expectation of life at birth, 4 years is attributable to higher death rates for circulatory diseases for males than females, and 5 years is due to higher death rates from external causes for males than females (Shkolnikov & Mesle, 1996, p. 130).

Large sex differences in mortality throughout the developed world

have been attributed mainly to differences between males and females in life style, especially smoking, alcohol consumption, and engaging in risky activities, such as reckless driving (Valkonen & Van Poppel, 1997; Waldron, 1997; Zhang et al., 1995). The decline in smoking in the United States is one of the success stories of a public health program leading to modification of life style. The Surgeon General's Report on Smoking and Health was issued in 1964. Per capita sales of cigarettes in the United States were at a high point of 4345 cigarettes in 1963. They had only declined to 4141 in 1974 and to 3446 in 1984 (United States, Surgeon General, 1989, p. 268). Thus, progress even in this successful campaign to change unhealthy life styles was not achieved quickly.

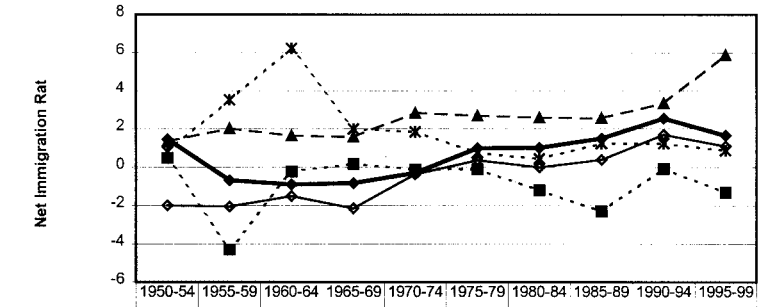
A vigorous anti-smoking program in Russia would be likely to improve male mortality in that country, and to narrow the sex differential in mortality, but results could not be expected quickly. A concern with the possibility of declining revenues from taxes on tobacco products would be a strong argument against such a program. The lack of such a strong program is a deficiency that has long been in place in Russia, but it is not deterioration in a program that earlier existed.

MIGRATION

With a low rate of natural increase in much of the developed world, mainly stemming from low fertility, some governments have considered immigration as a way to maintain the size of their populations (United Nations, 2000). The United States, Canada, and Australia are the major developed countries for which immigration has played a large role in population growth in the last fifty years. Also, Germany has had below replacement fertility since the 1970s (United Nations, 1999a, p. 202), but its population has grown due to substantial immigration (Soullie, 1995).

Figure 9 shows the net immigration rate for each of the five countries for every five-year period 1950–54 through 1995–99. Immigration has been a net contributor to population growth in Russia since the mid-1970s. Most of these immigrants were ethnic Russians who had lived elsewhere in the Soviet Union. By the end of the Soviet period, a pattern of net migration of Russians out of Russia had changed to a return flow of Russians to Russia, sufficient to balance those leaving Russia for other parts of the Soviet Union. This was part of a more general pattern of members of ethnic groups in the Soviet Union beginning to return to their areas of traditional settlement within the Soviet Union (Anderson & Silver, 1989, p. 641).

The flow of Russians back to Russia intensified after the dissolution of



	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99
Russia	1.5	-0.7	-0.9	-0.8	-0.3	1.0	1.0	1.5	2.5	1.6
Hungary	0.5	-4.3	-0.2	0.2	-0.1	-0.1	-1.2	-2.3	-0.1	-1.3
USA	1.3	2.0	1.6	1.6	2.8	2.7	2.6	2.6	3.3	5.9
Italy	-2.0	-2.1	-1.5	-2.1	-0.4	0.4	0.0	0.4	1.7	1.1
France	0.8	3.5	6.2	2.0	1.9	0.7	0.4	1.2	1.2	0.9

FIGURE 9. Estimated net immigration rate per thousand population.

the Soviet Union. As shown in Table 1, in 1989, 25 million ethnic Russians lived in the Soviet Union but outside of Russia. Thus, there was a large potential for ethnic Russians to migrate to Russia. Shortly after the dissolution of the Soviet Union, ethnic Russians coming to Russia from other parts of the former Soviet Union were considered refugees. Their return was seen as the result of increasingly hostile attitudes toward Russians elsewhere in the former Soviet Union (Korel, 1998; Michugina & Rakhmaninova, 1996; Zayonchkovskaya, 1999).

The number of immigrants to Russia peaked in 1994. Based on official Russian data, Table 3 shows the gross and net number of migrants between Russia and other parts of the former Soviet Union and between Russia and countries that were not earlier part of the Soviet Union in total for the three-year period 1998–2000 (Russia, Goskomstat, 2000, 2001).

In Figure 9 the high level of net immigration to the United States is clear. Figure 9 also shows the sharp effects that politics can have on immigration. The dip in Hungary in the late 1950s is due to the aftermath of the Hungarian uprising, and the increase in immigration to France in the early 1960s is related to the war in Algeria.

AGE DISTRIBUTIONS AND POPULATION AGING

The main cause of slowing population growth throughout the developed world is low fertility. Closely related is the aging of the population. As fertility declines, the number of people at younger ages becomes low

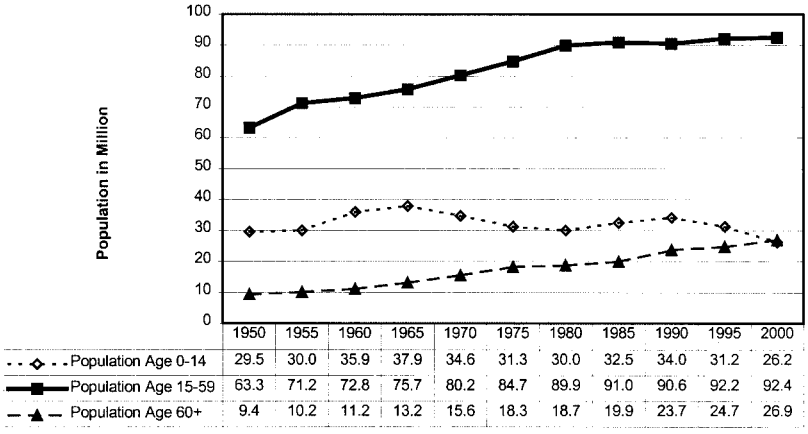
TABLE 3

Gross and Net Migration Flows Between Russia and Elsewhere in the Former Soviet Union and Between Russia and Countries not Formerly Part of the Soviet Union, 1998–2000

Immigrants to Russia from Elsewhere in Former Soviet Union	1,211,762
Emigrants from Russia to Elsewhere in Former Soviet Union	346,159
Net Immigration to Russia from Elsewhere in Former Soviet Union	865,603
Immigration to Russia from Rest of World (not including Former Soviet Union)	1,521
Emigration from Russia to Rest of World (not including Former Soviet Union)	246,673
Net Immigration to Russia from Rest of World (not including Former Soviet Union)	–245,152
Total Immigration to Russia	1,213,283
Total Emigration from Russia	592,832
Net Immigration to Russia	620,451

compared to the number of people at older ages. The average age of the population increases, and the proportion of the population above any given age increases. In addition, the ratio of the number of people in the working ages to the number of people older than the working ages declines.

Figure 10 shows the size of the population of Russia in three broad



	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000
Population Age 0-14	29.5	30.0	35.9	37.9	34.6	31.3	30.0	32.5	34.0	31.2	26.2
Population Age 15-59	63.3	71.2	72.8	75.7	80.2	84.7	89.9	91.0	90.6	92.2	92.4
Population Age 60+	9.4	10.2	11.2	13.2	15.6	18.3	18.7	19.9	23.7	24.7	26.9

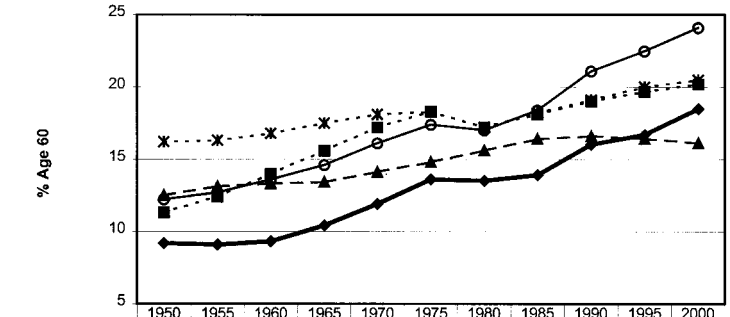
FIGURE 10. Population of Russia by age groups.

age categories, 0–14, 15–59, and 60+. The size of the two older groups has steadily increased over time, while the size of the 0–14 age group has generally declined since 1965, interrupted by some increase in the 1980s, related to increased fertility in that period. Figure 10 again makes clear that fertility decline, as reflected in smaller recent birth cohorts, is the primary cause of population decline in Russia.

As fertility has declined in Russia and the rest of the developed world, populations have become older. Figure 11 shows the percentage of the population age 60 or older in each of the five countries. Although the proportion of the population of Russia above age 60 is less than in any of the other countries except the United States, the rapid rate of growth of Russia's elderly population, combined with overall economic problems and problems of reorganization of pension systems, makes coping with an aging population very difficult for Russia. In Figure 11, Italy and Russia show the fastest rate of growth of their elderly populations since 1990 because among the countries considered, Italy and Russia had the lowest fertility since 1990.

DISCUSSION AND CONCLUSIONS

The concern with possible depopulation of Russia is motivated by both political and socio-economic considerations. After the dissolution of the



	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000
Russia	9	9	9	10	12	14	14	14	16	17	19
Hungary	11	12	14	16	17	18	17	18	19	20	20
USA	13	13	13	13	14	15	16	16	17	16	16
Italy	12	13	14	15	16	17	17	18	21	23	24
France	16	16	17	18	18	18	17	18	19	20	21

FIGURE 11. Percent of population age 60+.

Soviet Union, the Russian state and many people in Russia felt a substantial status loss. Part of these feelings were motivated by the much smaller size of the Russian Federation than of the Soviet Union.

Growing out of the mercantalist tradition, population size has long been equated with a nation's power (Dorn, 1963). As McIntosh (1983, p. 28) notes, "The belief that population numbers are directly related to national power is one of the most persistent themes in the history of population theory and policy." The size of population subgroups within countries continues to play an extremely important role in national politics (Bookman, 1997).

In 1950, 2000, and in the United Nations medium-variant projections for 2025, China and India are the two largest countries. The Soviet Union (or former Soviet Union) ranks third in 1950 and in 2000 and fourth in 2025, surpassed in population by the United States in 2025. If the Soviet Union is divided into its fifteen constituent republics, Russia then ranks fourth among all countries in population in 1950, with the United States as third. Russia ranks sixth in 2000, behind also Indonesia and Brazil, and tenth in 2025, behind also Mexico, Bangladesh, Nigeria, and Pakistan (United Nations, 2001, Table 2). Russia's arguments for world influence would be stronger in the year 2025 if it had the fourth largest population in the world than if it had the tenth largest population in the world.

In terms of a capability to carry out the tasks necessary in a modern country, the decline of the population of Russia from 148 million in 1990 to 145 million in 2000 is not the major problem. Since it is inconceivable that the Soviet Union will be reconstituted, the relevant issue for the future size of the population of Russia is the trajectory of demographic factors in Russia, especially regarding fertility.

Table 4 shows the projections of the population of Russia in the year 2025 made by the United Nations (2001) and by the United States Bureau of the Census (2000). The United Nations projected value is 92% of the United States Census Bureau projected value. Table 4 shows each projected value divided by the population of Russia in 1950, the same kind of calculation shown in Figure 1. The United Nations projection would have Russia's population in 2025 at the same size as it was in the early 1960s, while the U. S. Census Bureau projection would have Russia's population at the same size it was in the late 1970s. The projected population relative to Russia's population in the year 2000 is also shown.

The differences in the assumptions behind the two projections are indicated by the estimated values for 2025 of the TFR and of the expectation of life at birth used by the United Nations and the U. S. Census Bureau. The major difference between the two projections is the assumption about

TABLE 4

United Nations and U. S. Census Bureau Projections of the Population of Russia in 2025 and Estimated Demographic Values for 2025

	United Nations	U. S. Census Bureau
Projected 2025 Population in Millions	126.7	136.0
Projected 2025 Population Size Relative to 1950	1.23	1.33
Projected 2025 Population Size Relative to 2000	.87	.94
Estimated 2025 Total Fertility Rate	1.36	1.67
Estimated 2025 Expectation of Life at Birth (both Sexes Combined)	72	73

the future course of the Russia's fertility, with the U. S. Census Bureau assuming somewhat higher fertility than did the United Nations. That such a small difference in assumptions leads to a substantial difference in the projected population shows how sensitive population size is to the level of fertility.

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APPENDIX: DATA SOURCES

Total population, crude birth rates, crude death rates, total fertility rates, net reproduction rates, infant mortality rates, male and female expectation of life at birth and the proportion of the population over age 60 for 1950–1994 are from United Nations (1999a). Data on the number of people age 0–14, 15–59, and 60+ for 1950–1994 are from United Nations (1999b). Data for 2000 on total population, the proportions age 0–14, age 15–59 and age 60+, on the number of people age 0–14, 15–59, and 60+,

and for 1995–1999 on the infant mortality rate and on the total fertility rate are from United Nations (2001). Data on male expectation of life at birth and on female expectation of life at birth for the period 1995–1999 are from World Health Organization (2000) with the actual dates to which the data refer as follows: Russia: 1997, Hungary: 1997, USA: 1997, Italy: 1996, France: 1995. Values of the crude birth rate and crude death rate for 1995–99 for Hungary, USA, Italy, and France, which were used in combination with other information to calculate the net immigration rate for 1995–99 are for 1997 from United States Bureau of the Census (2000). The values of the crude birth rate and crude death rate for Russia for 1995–99 refer to 1997 and are from Russia, Goskomstat (1999). Cohort and period total fertility rates for the United States are from Heuser (1976: 4, 125). The value of NRR for Italy 1950–54 in United Nations (1999a) is reported as 1.09. This seems to have been a typographical error. The reported value of 1.09 has been changed for this analysis to 1.04, which is consistent with the value in the United Nations (1979, p. 393).

ENDNOTES

1. Usually migration into a region from within the same country is called inmigration, while migration into a country from another country is called immigration. Migration out of a region of a country to another part of the country is called outmigration, and migration out of the country is called emigration. For simplicity, the terms immigration and emigration are used throughout this paper.
2. For the period 1990–94, the growth rate for Estonia was –11.2 per thousand. This was the result of a natural rate of increase of –2.8 per thousand combined with a net immigration rate of –8.8 per thousand, from calculations based on data in United Nations (1999a, p. 182).
3. A net reproduction rate of 1.00 means that the stable population implied by the given population's age-specific fertility rates and the age-specific mortality rates will have a growth rate of zero.

REFERENCES

Anderson, B. A., & Silver, B. D. (1986a). Infant mortality in the Soviet Union: regional differences and measurement issues. *Population and Development Review, 12*, 705–738.

Anderson, B. A., & Silver, B. D. (1986b). Sex differentials in mortality in the Soviet Union: regional differences in length of working life in comparative perspective. *Population Studies, 40*, 191–214.

Anderson, B. A., & Silver, B. D. (1989). Demographic sources of the changing ethnic composition of the Soviet Union. *Population and Development Review, 15,* 609–656.

Anderson, B. A., & Silver, B. D. (1994). A comparison of Soviet mortality in the working ages: 1959–1988. In W. Lutz, S. Scherbov, & A. Volkov (Eds.), *Demographic trends and patterns in the Soviet Union before 1991* (pp. 295–338). London: Routledge.

Anderson, B. A., & Silver, B. D. (1997). Issues of data quality in assessing mortality trends and levels in the New Independent States. In J. L. Bobadilla, C. A. Costello, & F. Mitchell (Eds.), *Premature death in the new independent states* (pp. 120–155). Washington: National Academy Press.

Anderson, B. A., & Silver, B. D. (1999). The geodemography of infant mortality in the Soviet Union, 1950–1990. In G. J. Demko, G. Ioffe, & Z. Zayonchkovskaya (Eds.), *Population under duress: The geodemography of post-Soviet Russia* (pp. 73–103). Boulder: Westview.

Antonov, A. I. (1999). Demograficheskoe budushchee Rossii: depopulyatsiya navsegda? [Russia's demographic future: Is depopulation here forever?] *Sotsiologicheskie Issledovaniya, 3,* 80–87.

Ashton, B., Hill, K., Piazza, A., & Zeitz, R. (1984). Famine in China 1958–61. *Population and Development Review, 10*, 613–645.

Avdeev, A., & Monnier, A. (1994). A la decouverte de la fecondite russe contemporaire [A survey of modern Russian fertility]. *Population, 49*, 859–901.

Baiduzhy, A. (1994). Demographic disaster: Death/birth gap widens. *Current Digest of the Post-Soviet Press, 46*, 8–10.

Barr, D. A., & Field, M. G. (1996). The current state of health care in the former Soviet Union: Implications for health care policy and reform. *American Journal of Public Health, 86*, 307–312.

Blum, A., & Monnier, A. (1989). Recent mortality trends in the USSR: New evidence. *Population Studies, 43*, 211–241.

Bookman, M. Z. (1997). *The demographic struggle for power: the political economy of demographic engineering in the modern world*. Portland, Oregon: Frank Cass.

Breev, B. D. (1998). K voprosu o postarenii naseleniya I depopulyatsii [Problems of population aging and depopulation]. *Sotsiologicheskie Issledovaniya, (2),* 61–66.

Calot, G. (1997). Les politiques natalistes dans le pays industrialises [Pronatalist policies in developed countries]. In *Demographie: analyses et synthese. Causes et consequences des evolutions demographiques. Volume 3* (pp. 221–236). Paris: Centre Francais sur la Population et le Development.

Chantrel, L. (1994). Depopulation et reforme de la fiscalite en France aux XVIe–XVIIe siecles [Depopulation and fiscal reforms in France during the sixteenth and seventeenth centuries]. *Population, 49,* 457–479.

Chen, L. C., Wittgenstein, F., & McKeon, E. (1996). The upsurge of mortality in Russia: Causes and policy implications. *Population and Development Review, 22*, 517–30, 604, 607.

Chesnais, J. (1995). *Le crepuscule de l'Occident: denatalite, condition des femmes et immigration [The twilight of the West: depopulation, women's status, and immigration]*. Paris: Robert Laffont.

Coale, A. J., Anderson, B. A., & Harm, E. (1979). *Human fertility in Russia since the nineteenth century*. Princeton: Princeton University Press.

Davis, K. (1948). *Human society*. New York: Macmillan.

Dorn, W. L. (1963). *Competition for Europe, 1740–1763*. New York: Harper Torchbooks.

Feshbach, M. (1995). Population, health, and environmental crises in the former Soviet Union. In B. Cartledge (Ed.), *Population and the environment: The Linacre Lectures 1993–4* (pp. 165–184). Oxford: Oxford University Press.

Field, M. G. (1995). The health crisis in the former Soviet Union: A report from the post-war zone. *Social Science and Medicine, 41,* 1469–1478.

Heuser, R. L. (1976). *Fertility tables for birth cohorts by color: United States, 1917–1973*. Rockville: Maryland: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics.

Huss, M. M. (1990). Pronatalism in the inter-war period in France. *Journal of Contemporary History, 25*, 39–68.

Kharkova, T. L., & Andreev, E. M. (2000). Did the economic crisis cause the fertility decline in Russia? Evidence from the 1994 microcensus. *European Journal of Population, 16*, 211–233.

Korel, L. V. (1998). Refugees and forced migrants in Siberia. *Migration, 29–31*, 45–61.
Lee, R. (1990). The demographic response to economic crisis in historical and contemporary populations. *Population Bulletin of the United Nations, 29,* 1–15.
Lewin-Epstein, N., Ro'i, Y., & Ritterband, P. (1997). *Russian Jews on three continents: Migration and resettlement*. Portland, Oregon: Frank Cass.
Lopez, A. (1997). Mortality from tobacco in the New Independent States. In J. L. Bobadilla, C. A. Costello, & F. Mitchell (Eds.), *Premature death in the new independent states* (pp. 262–274). Washington: National Academy Press.
McIntosh, C. A. (1983). *Population policy in Western Europe.* Armonk, New York: M. E. Sharpe.
Michugina, A., & Rakhmaninova, M. (1996). Natsional'nyi sostav migrantov v obmene naseleniem mezhdu Rossiei i zarubezhnymi stranami [National composition of migrants in the exchange of population between Russia and other countries]. *Voprosy Statistiki, 12,* 44–48.
National Center for Health Statistics. (1995). *Vital and health statistics: Russian Federation and the United States, selected years, 1980–93*. Vital and Health Statistics 5(9). Washington: U. S. Government Printing Office.
Palloni, A., Hill, K., & Aguirre, G. P. (1993). *Economic swings and demographic changes in the history of Latin America* (Center for Demography and Eecology Working Paper 93-21). Madison: Center for Demography and Ecology, University of Wisconsin.
Peracca, S. (2001). *Economic change and individual well-being in Thailand: An examination of health and education*. Unpublished doctoral dissertation, University of Michigan, Ann Arbor.
Preston, S. H. (1970). *Older male mortality and cigarette smoking: A demographic analysis*. Population Monograph #7, Institute of International Studies, University of California: Berkeley.
Ranjan, P. (1999). Fertility behavior under income uncertainty. *European Journal of Population, 15*, 25–43.
Richards, T. (1984). Weather, nutrition and the economy: the analysis of short run fluctuations in births, deaths and marriages, France 1740–1909. In T. Bengtsson, G. Fridlizius, and R. Ohlsson (Eds.), *Pre-industrial population change* (pp. 357–389). Stockholm: Almquist and Wiksell International.
Rozenfeld, B. A. (1996). The crisis of Russian health care and attempts at reform. In J. DaVanzo (Ed.), *Russia's demographic "crisis,"* Conference Report CF-124-CRES (pp. 163–174). Santa Monica: RAND.
Russia, Goskomstat. (1999). *Handbook Russia 1999*. Available at http://www.gks.ru/.
Russia, Goskomstat. (2000). *Handbook Russia 2000*. Available at http://www.gks.ru/.
Russia, Goskomstat. (2001). *Handbook Russia 2001*. Available at http://www.gks.ru/.
Rutkevich, M. N. (1996). Depopulyatsiya ili vyrimanie? [Depopulation or extinction?]. *Sotsiologicheskie Issledovaniya, 3,* 104–110.
Ryder, N. B. (1986). Observations on the history of cohort fertility in the United States. *Population and Development Review, 12,* 617–643.
Shkolnikov, V. M., & Mesle, F. (1996). Chapter 4. The Russian epidemiological crisis as mirrored by mortality trends. In J. DaVanzo (Ed.), *Russia's demographic "crisis,"* Conference Report CF-124-CRES (pp. 113–161). Santa Monica: RAND.
Shkolnikov, V. M., Mesle, F., & Vallin, J. (1997). Recent trends in life expectancy and causes of death in Russia, 1970–1993. In J. L. Bobadilla, C. A. Costello & F. Mitchell (Eds.), *Premature death in the new independent states* (pp. 34–54). Washington: National Academy Press.
Shkolnikov, V. M., & Nemtsov, A. (1997). The anti-alcohol campaign and variations in Russian mortality. In J. L. Bobadilla, C. A. Costello, & F. Mitchell (Eds.), *Premature death in the new independent states* (pp. 239–261). Washington: National Academy Press.
Soullie, J. (1995). La demographie allemande: un tabou? [German demography: a taboo subject?]. *Problemes Economiques, 2428*, 16–21.
Spengler, J. J. (1938). *France faces depopulation*. Durham, N. C.: Duke University Press.

Taffel, S. (1978). *Trends in fertility in the United States*. Rockville, Maryland: U. S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics. Series 21, no. 28.

Treml, V. G., (1997). Soviet and Russian statistics on alcohol consumption and abuse. In J. L. Bobadilla, C. A. Costello & F. Mitchell (Eds.), *Premature death in the new independent states* (pp. 220–238). Washington: National Academy Press.

Ueno, C. (1998). The declining birthrate: Whose problem? *Review of Population and Social Policy, 7,* 103–128.

United Nations. (1979). *Demographic Yearbook 1978: Historical supplement*. New York: Author.

United Nations. (1999a). *World population prospects. The 1998 revision. Volume I: Comprehensive tables*. New York: Author.

United Nations. (1999b). *World population prospects. The 1998 revision. Volume II: Sex and age*. New York: Author.

United Nations. (1999c). *Population in Europe and North America on the eve of the millennium: Dynamics and policy responses.* Regional population meeting, 7–9 December 1998, Budapest. New York: Author.

United Nations. (2000). *Replacement migration: Is it a solution to declining and ageing populations?* New York: Author.

United Nations. (2001). *World population prospects: The 2000 revision. (Highlights and tables).* Available at *http://www.un.org/esa/population/unpop.htm*.

United Nations Development Program, Regional Bureau for Europe and the CIS. (1998). *Poverty in Transition?* New York: Author.

United States Bureau of the Census. (2000). *International Data Base*. Available at http://www.census.gov/ipc/www/idbacc.html.

United States, Surgeon General. (1989). *Reducing the health consequences of smoking: 25 years of progress*. United States Department of Health and Human Services. Washington, D. C.: U. S. Government Printing Office.

Valkonen, T., & Van Poppel, F. (1997). The contribution of smoking to sex differences in life expectancy: four Nordic countries and the Netherlands 1970–1989. *European Journal of Public Health, 7,* 301–310.

Waldron, I. (1997). What do we know about causes of sex differences in mortality? In P. Conrad (Ed.), *The Sociology of Health and Illness: Critical Perspectives* (pp. 42–54). New York: St. Martin's Press.

World Bank. (2001). *Country Data Profile: Russian Federation*. Available at http://devdata.worldbank.org/dgprofile.asp?rmdk=82514&w=0&L=E.

World Health Organization, Statistical System. (2000). *Mortality data*. Available at http://www.who.int/whosis/statistics/.

Zakharov, S. V., & Ivanova, E. I. (1996). Chapter 2. Fertility decline and recent changes in Russia: On the threshold of the second demographic transition. In J. DaVanzo (Ed.), *Russia's demographic "crisis,"* Conference Report CF-124-CRES (pp. 36–82). Santa Monica: RAND.

Zayonchkovskaya, Z. (1999). Recent migration trends in Russia. In G. Demko, G. Ioffe, & Z. Zayonchkovskaya (Eds.), *Population under duress: the geodemography of post-Soviet Russia* (pp. 107–136). Boulder: Westview Press.

Zhang, X. H., Sasaki, S., & Kesteloot, H. (1995). The sex ratio of mortality and its secular trends. *International Journal of Epidemiology, 24*, 720–729.