Source: *Russia and Globalization: Identity, Security, and Society in an Era of Change* / Ed. by D. W. Blum, p. 37–78. Baltimore, MD: Johns Hopkins University Press, 2008.

Russian Demographic Crisis in Cross-National Perspective[*]

Andrey Korotayev and Darya Khalturina

Introduction

Globalization has radically changed demographic processes in all parts of the world, including Russia. However, we argue that it is important to consider globalization in long-term perspective. Before the start of the modern phase of the globalization (that is, most of history) humankind remained at the first phase of demographic transition, characterized by very high fertility and mortality rates, very low life expectancies (for both males and females), and very low levels of per capita GDP.[1] At present only a few least-developed countries (mostly in tropical Africa) remain close to this situation. Here (in the range of $400–3000 of per capita GDP) even a very small growth in per capita GDP leads to considerable growth of life expectancy for both males and females (from less than 30 to almost 70 years). This is achieved through the elimination of famine, introduction of cheap medicines, improvements in sanitation, and so on. From this perspective, globalization has positively affected demographic and social dynamics nearly all over the world.

[*] The authors would like to acknowledge support provided for the writing of this article by the Russian Humanitarian Scientific Foundation (Grant Number 06-06-020-72 for the project, "Demographic Processes as Factors of the Image of Russia in the Modern World"), and by the Russian Foundation for the Support of National Science.

However, in the range between $3000 and $10000 the correlation between per capita GDP growth and increase in life expectancy drops almost to zero. Indeed, the average life expectancy in countries with per capita GDP between $3000 and $4000 is about 69 years, whereas in countries with per capita GDP between $8000 and $11000 the average life expectancy for males is around 70 years (that is higher by just a year). Of course, in the richest countries of the world (i.e., with per capita GDP of more than $25000) the average life expectancy for males is significantly higher still – 75.6 years. However, this increase is achieved through the investment of billions of dollars in modern health care.[2]

What is striking is that life expectancy in Russia (and the other culturally similar countries of the former Soviet Union) is anomalously low for the level of economic development achieved by these countries. Indeed, dozens of countries with much smaller per capita GDP have much higher life expectancies.[3] This is attributable to anomalously high mortality rates, which powerfully affects the demographic situation in Russia. Moreover, it has occurred at a time of rapidly increasing globalization. In the following sections we argue that this pattern is explainable largely due to widespread, rapid alcohol consumption among men (in addition to other, secondary factors).

Comparative Demographic Dynamics in the Former USSR

The collapse of the Soviet Union was accompanied by a demographic crisis, the so-called "Russian Cross" (see Fig. 1).

Figure 1. Dynamics of Birth Rate and Mortality Rate (per 1000 people) in Russia 1978–2003 ("Russian Cross")

Source: World Bank, World Development Indicators (Washington, DC: World Bank, 2004)

In this period the birth rate dropped from 17.2 to 9.4 live births per 1000 people, whereas the total fertility rate (TFR) fell from 2.0 to 1.3 children per woman. The mortality rate grew from 10.4 deaths per 1000 people in 1986 to 15.7 in 1994, a catastrophic and abnormal level. In 1991–1992 mortality rate equaled birth rate, and soon substantially exceeded it. This resulted in a rapid population decline.

Russia is not the only country that faced such problems. In addition to the "Russian cross," one can point to the early Hungarian "cross," and also Bulgarian, Belorussian, Estonian, Latvian, and Ukrainian "crosses." Almost all these countries shifted to a quite adverse demographic pattern in the early 1990s, which still persists. Consequently, it is necessary to concentrate on this transition

period in order to understand both the nature of the shift and the contemporary demographic realities in the region.

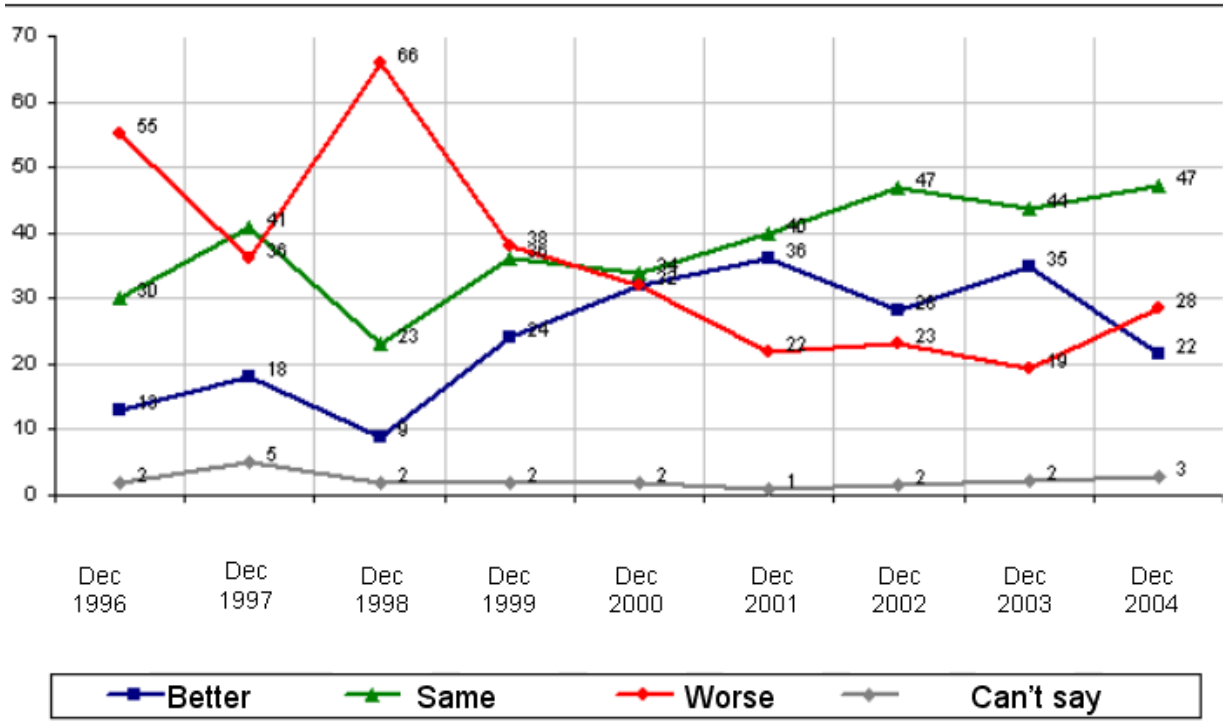
Several hypothetical causes of the abnormally high mortality rates in Russia have been suggested. One of the most frequent explanations is the economic and social crisis which resulted, among other things, in social depression and high levels of stress.[4] Vishnevskiy and Shkolnikov point out that the long term death crisis in Russia could be at least partially caused by the unfinished second phase of epidemiological transition, or in other words the transition from passive struggle with causes of mortality to active struggle for high levels of health care. According to them, this situation was caused by the low efficiency of the Soviet administrative system, which had no serious motivation to develop effective health care for citizens.[5] Additionally, medical research shows that the consumption of alcohol, drugs and tobacco has a significant impact on high morality rates in Russia.[6] In fact, most researchers consider alcohol to be the major factor behind the abnormal mortality rate in this country.[7]

Our study aims to determine the differential impact of the above-mentioned factors on the demographic crisis in Russia, through extensive statistical analysis. Cross-national research is important as well, since similar factors ought to have similar influences on human populations in different countries.

Psychological Stress

Comparison of polling data and demographic indicators shows quite clearly that socio-psychological factors are not the key determinant of mortality in Russia. A nationwide monitor of the public opinion in Russia reflects considerable improvement in the estimation of quality of life by Russian citizens from 1998 to 2001. Yet at the same time, the mortality rate increased greatly from 13.5% in 1998 to 15.6% in 2001.[8]

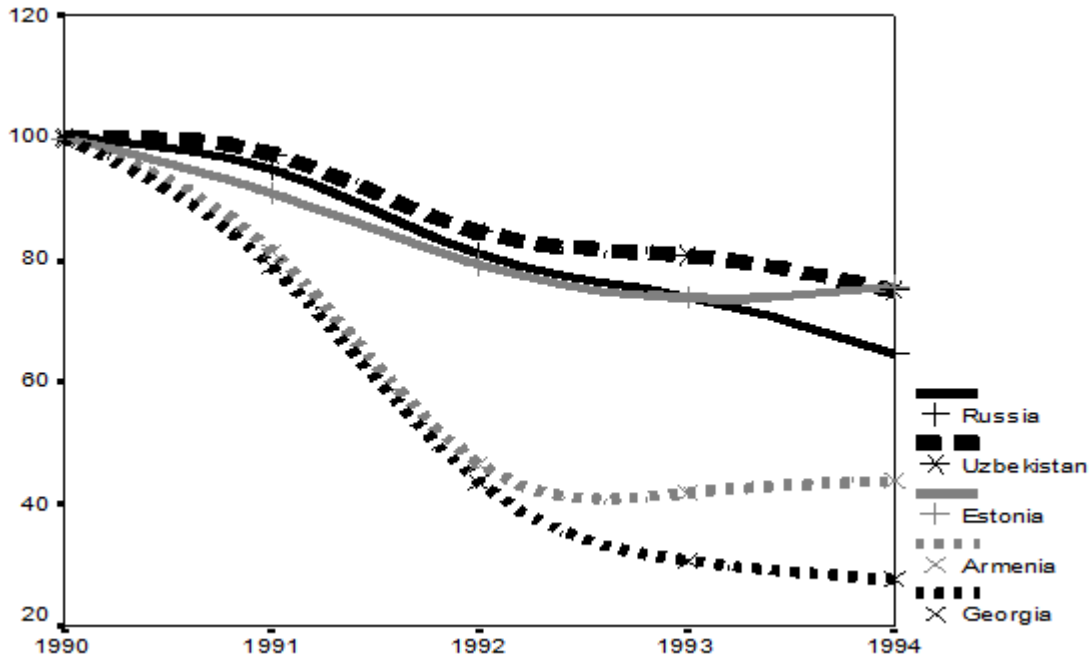
Fig. 2. Generally speaking, was this year better worse or the same as the previous one? (FOM 2004)



Economic Collapse

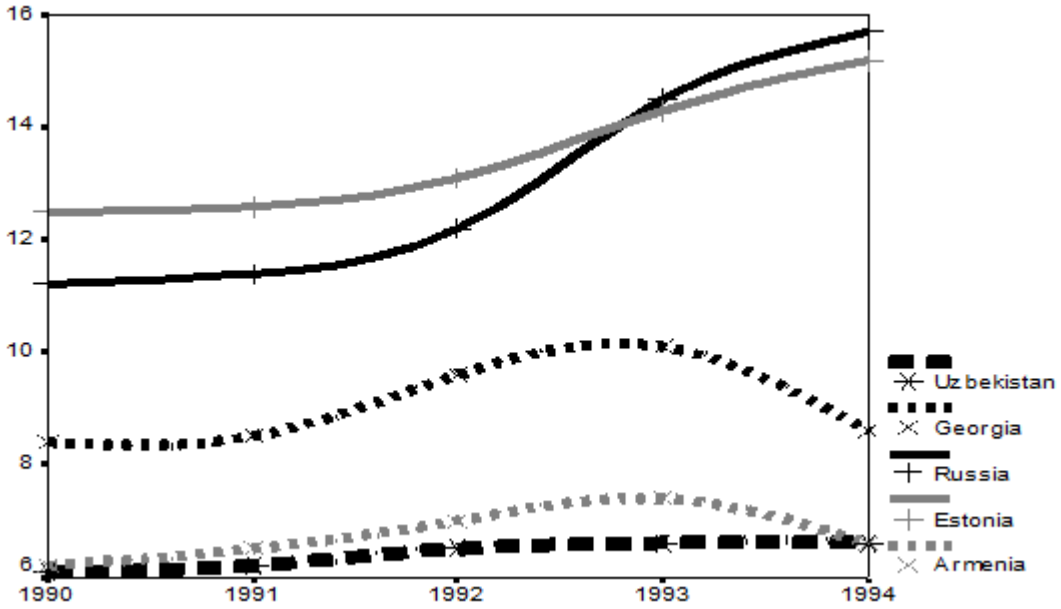
Moreover, even preliminary observations show that economic explanations for the abnormal mortality rate in post-Soviet countries are insufficient.

Figure 3. Per capita GDP in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994 (1990 per capita GDP = 100)



Source: Angus Maddison, Monitoring the World Economy: A Millennial Perspective (Paris: OECD, 2001), 341.

Figure 4. Dynamics of Mortality Rates (per 1000 people) in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994



Source: World Bank, World Development Indicators, 2004.

For example, the economic crises in Armenia and Georgia were far more serious than in Russia. Between 1990 and 1994 (when the "Russian Cross" began) Russian GDP per capita declined from $7762 (in 1990 international dollars, in purchasing power parity) to $5024, whereas in Armenia it fell from $6142 to $2701, and in Georgia the drop was even more catastrophic – from $7569 to $2100.[9]

As mentioned above, in this period the mortality rate in Russia increased by more than 40% (and reached 15.7%); at the same time, in 1990–1993, mortality in Armenia – which experienced a much more catastrophic economic decline – increased by less than 20% (reaching 7.4%). What is more, already in 1994 the mortality rate in Armenia decreased to 6.6%, just 107% of the 1990 level, whereas by 1998 it fell to 6.1%, even though by that year Armenian per capita GDP had only recovered to half of the 1990 level and constituted less than 75% of Russian per capita GDP.

The post-Soviet economic crisis was especially catastrophic in Georgia, where in 1990–1993 per capita GDP dropped more than three times as compared to the 25% decline in Russia (even though per capita GDP in Russia in 1993 was more than twice as large as Georgia's). However, at the same time the Georgian mortality rate increased just 20% (from 8.4 to 10.1%), as compared to a 30% increase (from 11.2 to 14.5%) in the same years in Russia. Already by 1994, despite the continuing economic decline, the mortality rate in Georgia dropped almost to the pre-crisis level (to 8.6%), whereas by 1996 it had decreased well below the pre-crisis level (7.1% in 1996 as compared to 8.4% in 1990).[10]

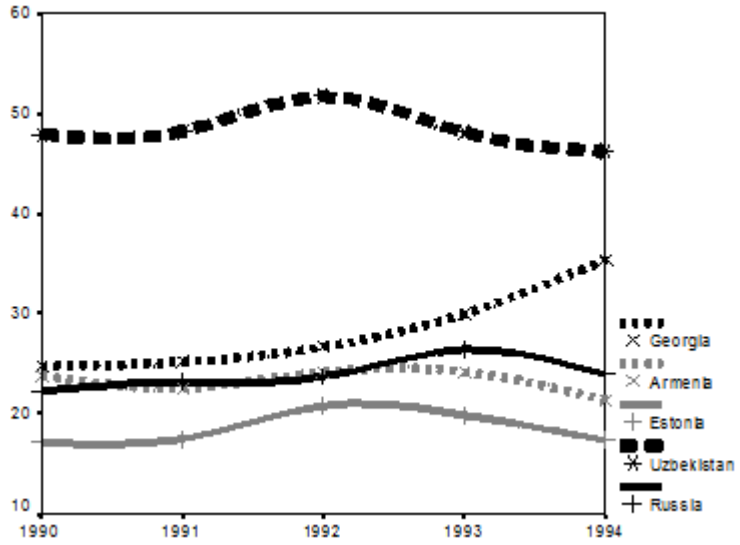
The magnitude of economic decline in post-Soviet Estonia and Uzbekistan was approximately the same: between 1990 and 1994 in both countries per capita GDP decreased about 25%. Note, however, that in 1994 per capita GDP in Estonia (in absolute terms) was more than 150% higher than in Uzbekistan ($8123 as compared to $3199).[11] Because per capita GDP decline leads to higher mortality rates in low-income than in middle-income countries,[12] one has grounds to ex-

pect that if the post-Soviet mortality increase was caused mainly by economic crisis, in 1990–1994 the mortality rate in Uzbekistan should have increased much more than in Estonia. In reality we observe just the opposite. In Uzbekistan in 1990–1994 the mortality rate grew just 8% (from 6.1 to 6.6%). At the same time, in much more prosperous Estonia the mortality rate grew more than 20%, and by 1994 reached a catastrophic 15.2% level. By 1998 the Estonian economy had more or less recovered to the pre-crisis level, whereas in Uzbekistan the per capita GDP was still at only 77%.[13] Yet in the meantime, the mortality rate in Uzbekistan fell below the pre-crisis level (to 5.9%), whereas in Estonia it remained well above (at 14%).

Of course, one might suspect that the above-mentioned differences between the former Soviet countries might be accounted for by a difference in age structure. Hence, it makes sense to study the mortality rate dynamics for different age groups separately.

The mortality rate dynamics for children below 5 years for Estonia, Russia, Armenia, Georgia and Uzbekistan in 1990–1994 are as follows:

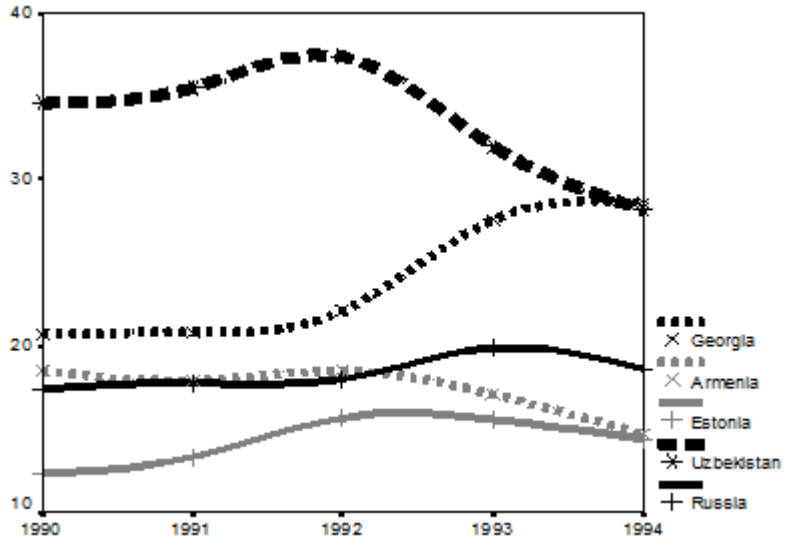
Figure 5. Child (<5 year old) Mortality Rates (per 1000 live births) in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994



Source: UNICEF, Innocenti Social Monitor 2004 (Florence: UNICEF Innocenti Research Centre, 2004), 68.

Thus, in 1991–1993 a rise of children mortality was observed in all of the countries in question (in fact it was observed in all countries of the former Soviet Union without exception. To a considerable extent this was connected with a rise of infant mortality rates:

Figure 6. Infant Mortality Rates (per 1000 live births) in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994



Source: UNICEF, Innocenti Social Monitor 2004, 68.

In sum, there does not seem to be any serious doubt that the rise in child and infant mortality in the former Soviet countries in the early 1990s was caused mainly by the post-Soviet economic crisis, whereby a sharp decline in per capita GDP led to serious underfunding of the health care system, a shortage of medicines in maternity hospitals, and so on. Similarly, a rise in mortality rates in Uzbekistan (and other former Soviet Central Asian countries) in the early 1990s appears to have been caused to a considerable extent by a rise in infant and early child mortality rates. The influence of this factor also seems to be rather important for Georgia (which was struck by

the post-Soviet economic crisis in the most serious way). This explanation, however, does not appear to be applicable to Russia, Estonia and the other countries in the European part of the former USSR. No doubt, the rise of the infant and early child mortality contributed to the increase in mortality rate in Russia in the early 1990s; however, this contribution appears to account for a very small fraction of the increase. Suffice it to mention that between 1990 and 1994 the child mortality rate in Russia grew 7.2%, whereas the overall mortality rate increased 40.2%.[14]

Organized Violence

To understand the causes of the catastrophic rise in mortality in Russia, as well as in the former Soviet countries of Europe and Transcaucasia, it seems relevant to consider mortality rates for older age groups (especially males). Let us start with males in the age groups 20–24, 25–39 and 40–59 (see Figures 7–9)[15]:

Figure 7. Mortality Rates for 20–24 year old males in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994

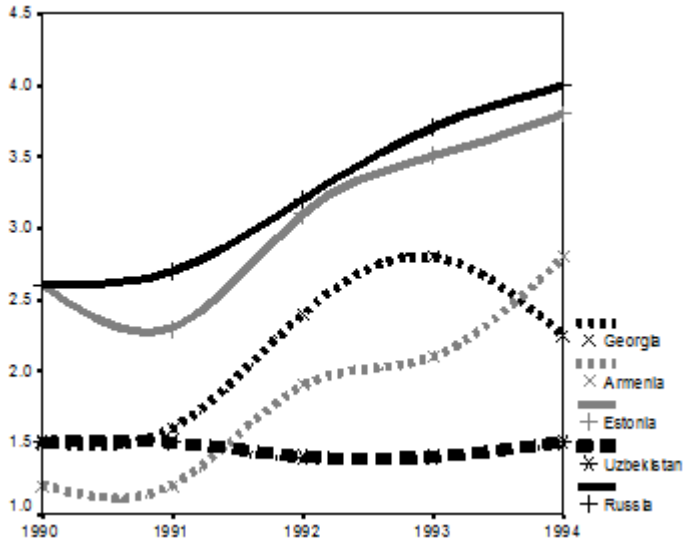


Figure 8. Mortality rates for 25–39 year old males in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994

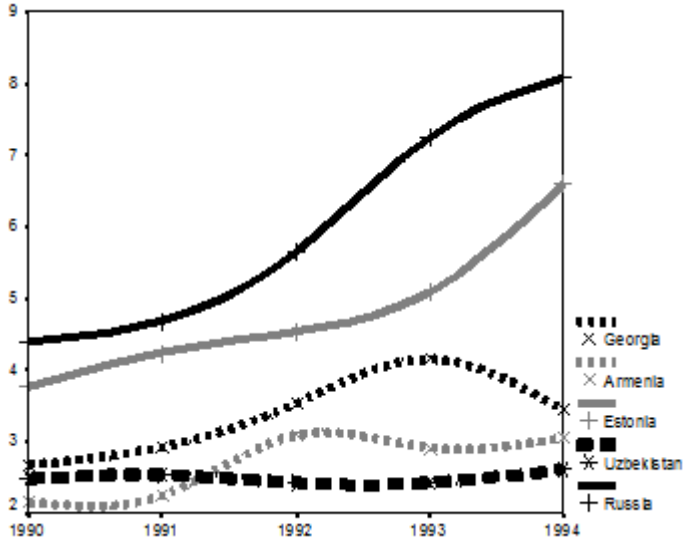
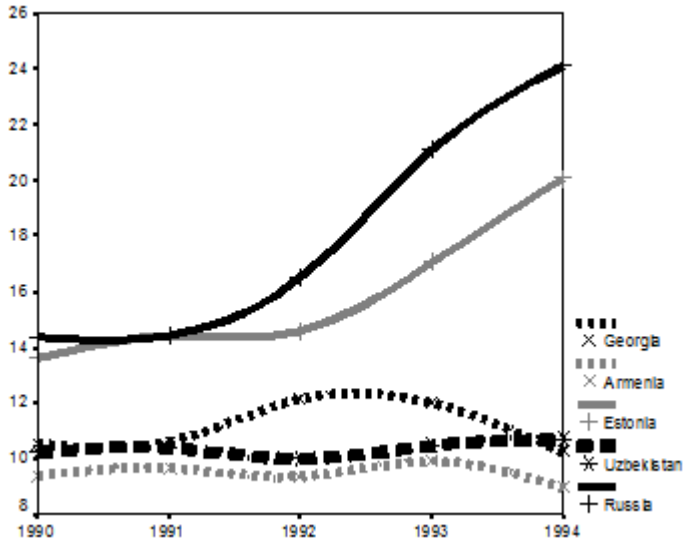


Figure 9. Mortality Rates for 40–59 year old males in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994



As one can see, the sex-age specific mortality rate dynamic is characterized by strikingly different patterns in different parts of the former Soviet Union. In Uzbekistan in 1990–1994 we do not observe any significant growth of male mortality for any of the age-groups analyzed above. We do observe some growth in Armenia and Georgia, but very different from the pattern in Estonia and Russia. In Armenia we find a very significant growth of mortality rates among 20–24 year old males during 1990–1994. However, already by 1995 it had fallen almost to the pre-crisis level, which coincides with the Karabakh 1994 cease-fire. It is also remarkable that the sharp rise in mortality rates among 20–24 year old males during 1990–1994 was accompanied by only a moderate increase in mortality among 25–39 year old Armenian males, and no increase at all among 40–59 year old males (as we shall see below the same can be also said about the Armenian females). Thus, the mortality rate increase in Armenia was restricted entirely to "fighting age" males, probably connected to the Karabakh war.

In Georgia in 1990–1993 we observe a mortality rate increase among all analyzed age-groups of males. However, it was sharpest among 20–24 year olds, less pronounced among 25–39 year olds, and weakest among 40–59 year ones. As we shall see below, a relatively weak but significant growth of mortality rates is observed during these years among Georgian females also. However, after 1993, mortality rates drop sharply to pre-crisis (or almost pre-crisis) levels among all analyzed sex-age groups. This suggests that the rise in mortality rates in Georgia during 1990–1993 was connected almost exclusively with the rise of violent conflict (especially the Abkhazia war). In Georgia this conflict was internal (unlike the Karabakh war for Armenia), and therefore involved a considerable death toll not only on the part of fighters, but also on the part of the civilian population (both male and female). However, casualties among the "fighting sex-age" groups were significantly higher, and this appears to account for the characteristic sex-age mortality rate we find in Georgia for the period 1990–1994.

The pattern in Russia and Estonia (and in fact for all the other European countries of the former Soviet Union)[16] is the precise opposite of that for Georgia and Armenia: i.e., we observe a sharp growth of mortality rates among all the age groups of males; however, among older age groups it was stronger than among 20–24 year olds. Obviously, this pattern cannot be accounted for by either political-military or economic factors.

It also seems relevant to consider age-specific female mortality[17]:

Figure 10. Mortality rates for 20–24 year old females in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994

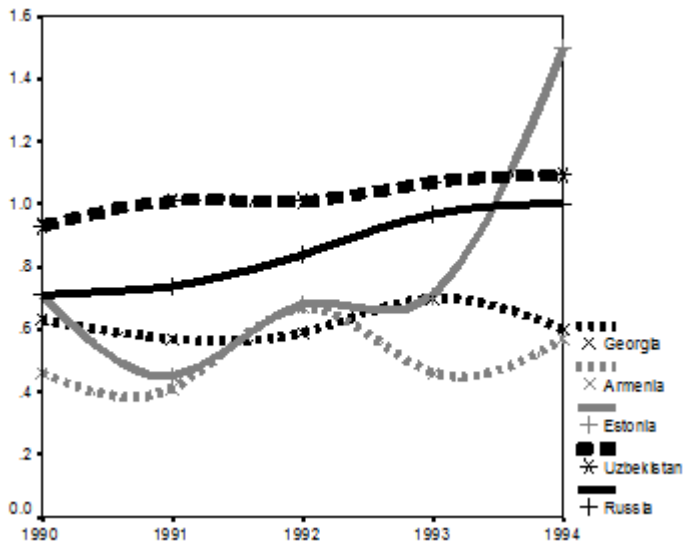


Figure 11. Mortality rates for 25–39 year old females in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994

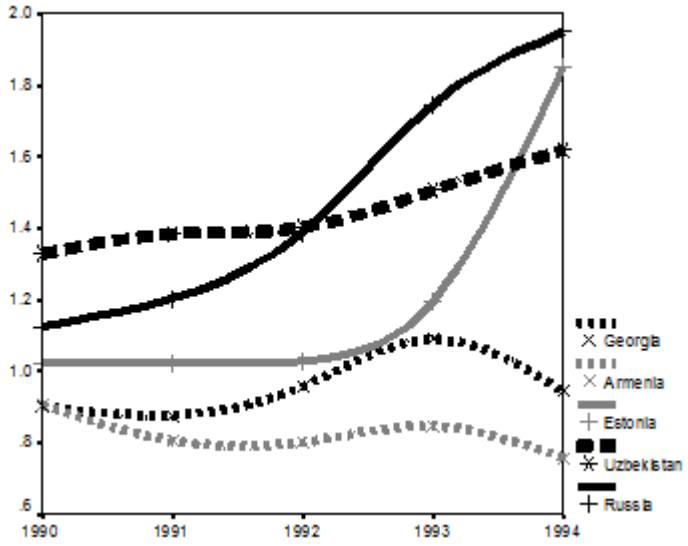
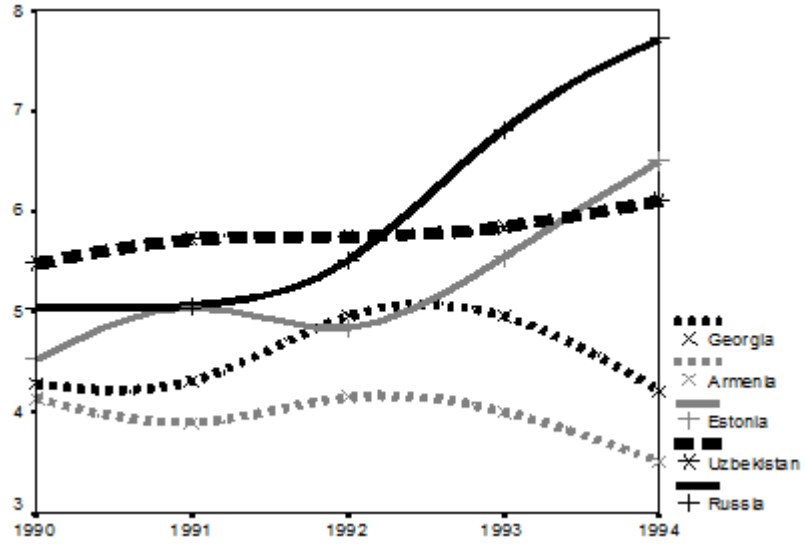


Figure 12. Mortality rates for 40–59 year old females in Estonia, Russia, Georgia, Armenia and Uzbekistan 1990–1994



Let us start with the observation that for Uzbekistan in 1990–1994 we find a significant (though weak relative to the other former Soviet countries) increase in mortality rates, which stands in remarkable contrast to the mortality rate dynamics for Uzbek males, for whom no such

growth in mortality is observed. It seems plausible to connect this mortality increase with the post-Soviet economic crisis, which suggests that the burden of the crisis fell on Uzbek females to a higher extent than on Uzbek males (which in turn may be connected with the emphatically dominant position of males in Central Asian countries). Neither this economically generated mortality increase, nor even the warfare-produced mortality increase observed in the countries of Transcaucasia, can be compared to the enormous increase in Russia, Estonia and the other European countries of the former USSR.

In contrast, the absence of any significant mortality increase among all analyzed age groups of Armenian females confirms the conclusion that the overall mortality increase found in Armenia during these years is almost exclusively accounted for by an increase in mortality rate among fighting age Armenian males, due to warfare in Karabakh.

Mortality rate dynamics among all analyzed age groups of Georgian females follows quite closely the pattern for non-fighting age Georgian males: i.e., it increased during the period of intense internal warfare (especially in connection with the war in Abkhazia); however, this increase was dramatically smaller than that observed among fighting age Georgian males. The end of intensive internal warfare led to an immediate drop in mortality rates among all analyzed sex-age groups, although naturally this drop was especially strong among fighting age Georgian males. The difference between the Armenian and Georgian mortality rate dynamics is accounted for by the difference of external versus internal warfare patterns. That is, external warfare in Karabakh led to a rise in the mortality rates among fighting age Armenian male citizens only, whereas the rise in mortality rate in Georgia was caused by internal warfare, from which all sex-age groups suffered, although fighting age males suffered most.

As regards the difference between male and female mortality rate dynamics, Russia and Estonia stand in sharp contrast to Armenia and Georgia, on the one hand, and Uzbekistan (as well as the other former Soviet Central Asian states),[18] on the other. In Russia and Estonia, in all ana-

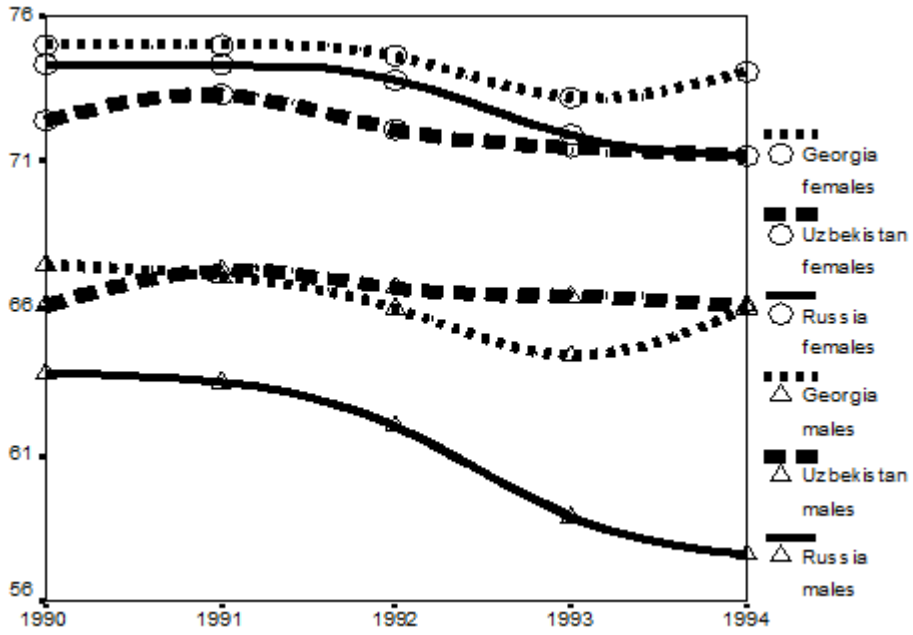
lyzed age groups during 1990–1994, female mortality increased rather substantially (and much more than in Central Asia or Transcaucasia). However, male mortality in all analyzed age groups increased much more than female mortality.

Yet there are no rational grounds for assuming that the economic crisis should increase male mortality far more than female mortality (in fact, the case of Uzbekistan suggests that females might suffer from economic crisis significantly more than males). Against this background, the fact that male mortality in Russia and Estonia during 1990–1994 increased to a qualitatively higher level than female mortality provides additional evidence that economic crisis was not the main cause of the sharp increase in overall mortality rates.[19]

Logically, this pattern of mortality dynamics should have led to a situation in which female life expectancies in Russia, Estonia and the other European countries of the former Soviet Union (but not Central Asia and Transcaucasia) should have decreased significantly; however, male life expectancies should have decreased far more, which in turn should have led to a dramatic gap between male and female life expectancies. And indeed this was the case.

Compare first the life expectancy dynamics in Russia, Georgia, and Uzbekistan:

Figure 13. Life Expectancy at Birth in Russia, Georgia, and Uzbekistan 1990–1994



Source: UNICEF, Innocenti Social Monitor 2004, 72–73.

As we see, in Uzbekistan 1991–1994 both male and female life expectancies experienced a certain decline (in fact, rather small in comparison with the countries of the former Soviet "North"). However, the decline in male life expectancy was the smaller than that for females. As a result, during these years in Uzbekistan we observe a certain decrease in the gap between male and female life expectancies.

As one would expect from the data on sex-age specific mortality dynamics in Georgia, during 1990–1993 the internal warfare in this country led to a sizeable decline in both male and female life expectancies. Predictably, however, the decline of male life expectancies these years was somewhat more pronounced, and this did lead to a certain widening of the gap between the male and female life expectancies. Yet the end of intense internal warfare immediately narrowed this gap.

In Russia we observe a dramatically different pattern. In 1990–1994 female life expectancies in Russia declined more than in either Georgia or Uzbekistan. However, even this tragic decrease pales in comparison with the truly catastrophic drop in male life expectancies, as a result of which the largest increase in the gap between male and female life expectancies took place in Russia. As we shall see below, to a considerable extent this also accounts for the dramatic drop in fertility rates which took place in Russia during these years.

Deterioration of Health Care

A number of researchers have explored the possibility that a deterioration of the medical care system was the major cause of the mortality crisis. However, as Shkolnikov and Cherviakov argue, "In spite of what looks obvious, Russia avoided a sharp decline in health care expenses during 1992−1995. According to two independent estimates, the decline (taking into account inflation) was about 10%. The number of hospital beds per thousand people remained almost the same. Thus, the collapse did not take place."[20]

A number of other facts also indicate that the degradation of the Russian medical care system was not catastrophic. For example, a study of stroke rates in Novosibirsk covering the period 1987−1994 shows that stroke mortality increased because of an increase in the number of strokes, but that the fatality rate for those who suffered a stroke did not change.[21] Moreover, the recent decline in maternal and infant mortality, as well as in mortality among children suffering from leukemia, indicate positive dynamics in Russian medial care which must be connected with the economic growth.[22]

Moreover, Andreev and colleagues calculated morality from treatable causes in Russia and Great Britain. Their calculations suggest that if the Russian health care system were to improve to the British level, the difference in life expectancy between the two countries would only decrease

by 1.7 years for men and 1.5 years for women. However, the actual difference is currently 12 years for women and 16 years for men.[23] Finally, Breinerd and Cutler performed a cross-national statistical analysis of factors affecting male mortality in post-socialist countries, including private and public medical spending. According to their analysis, increased medical spending is *positive-ly* related to increased mortality.[24] This could be explained by the fact that the poorest countries, such as the Transcaucasian and Central Asian states, experienced the lowest increase in mortality among post-socialist countries during the 1990s.[25]

The key point is that the major share of excess deaths (in comparison to Western countries) in Russia (as well as in Byelorussia, Ukraine and the Baltic states) is concentrated among working age males.[26] This distribution implies the importance of alcohol as a factor, because East Slavic and Baltic states, unlike Central Asian or Transcaucasian countries, have severe problems with alcoholism.

Alcohol consumption varies from a few milliliters of pure alcohol in the poorest and Islamic nations, to 15–20 liters in some European, Caribbean and tourist-oriented countries (in the latter cases data on alcohol consumption often seems exaggerated).[27] According to the World Health Organization, alcohol consumption in Russia was 10.7 liters of pure alcohol per adult per year in 2001.[28] However, in fact alcohol consumption in Russia is higher than this, because of illegal in-dustrial and domestic production of spirits. According to experts, real alcohol consumption is Russia is about 14.5 liters of pure alcohol per adult per year, which corresponds to approximately 180 bottles of vodka per adult male per year.[29]

According to careful calculations made by Aleksandr Nemtsov, about one third of all deaths in Russia are directly or indirectly due to alcohol.[30] Nemtsov also suggests that 72.2% of murders, 42.1% of suicides, 52.6% of other deaths from external causes, 67.6% deaths from kidney cirrho-sis, 60.1% pancreatic deaths, 23.2% deaths from cardiovascular disease, and 25.0% of all other deaths are alcohol related.[31] These findings are more or less supported by other researchers as

well. For example, autopsies in Izhevsk showed significant levels of blood alcohol in 61.8% of males aged 20−55.[32] In most cases, alcohol is not a direct cause of death (as in the case of alcoholic poisoning), but is rather a stimulator of cardiovascular and other crises. In such cases, alcohol is not recorded as a cause of death in official death reports, which leads to a great underestimation of the impact of alcohol on mortality rate in official statistics.

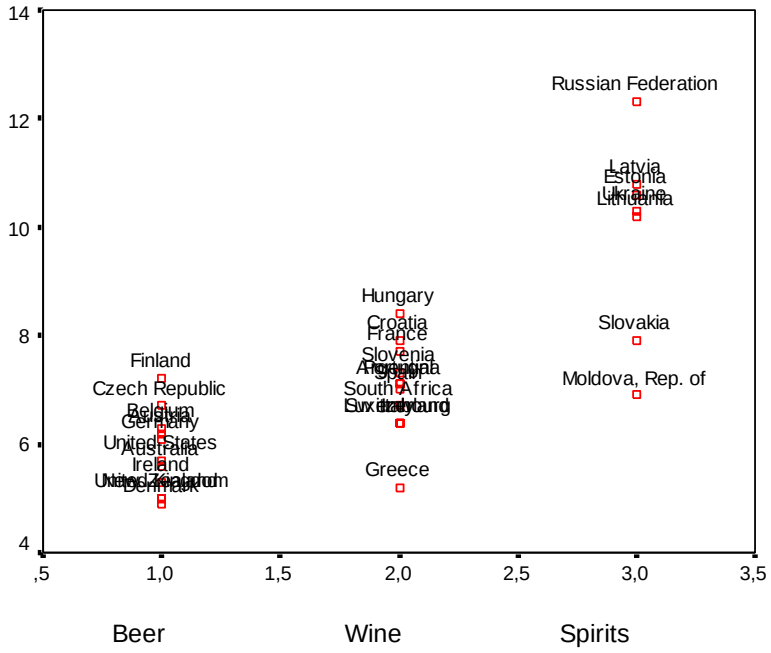
A study of the impact of anti-alcohol campaign (1985–1987) on mortality rates in the Soviet Union also reveals the significance of the alcohol factor. During this campaign, a 25% decrease in alcohol consumption led to a decline in mortality rate of 12% for males and 7% for females. Mortality due to alcohol poisoning declined by 56%.[33] The male mortality rate from accidents and traumas declined by 36%, from pneumonia by 40%, from other ventricular diseases by 20%, from infectious diseases by 20%, and from cardiovascular diseases by 9%. Yet after the end of the anti-alcohol campaign, mortality rates – especially male mortality rates – increased sharply due to a growth in alcohol consumption and other negative social tendencies.[34]

A comparison of various regions of the Russian Federation also supports the alcohol hypothesis. First, it should be noted that life expectancy is highest in Ingushetia and Dagestan, which are the poorest (except for Chechnya) but are deeply Islamic, and thus have the lowest rates of drinking in Russia. In Russia, average life expectancy was 59 years for men and 72 years for women in 2002. The corresponding numbers were 70 and 79 for Ingushetia and 67 and 76 for Dagestan. Cross-regional statistical analysis performed by Nemtsov confirmed that about one third of Russian mortality is caused by alcohol. Nemtsov also showed that alcohol related problems in Russia increase from South to North and from West to East (just as in Europe).[35]

It is important to recognize that in some countries, an equally high level of alcohol consumption is not accompanied by abnormally high mortality rates. Among these countries we find Portugal, Ireland, the Czech Republic, France, Germany, and Austria. We would argue that this is related to the *structure* of alcohol consumption: i.e., the main type(s) of alcoholic beverages con-

sumed. Of course, life expectancy is influenced by a number of factors, such as income levels, the quality of health care, environmental situation, psychological factors, and so on. These factors ought to affect men and women in more or less similar ways. However, men consume significantly more alcohol than women. Consequently, the effect of various types of alcoholic drinks should be reflected not only in overall life expectancy indicators, but especially in the difference between female and male life expectancy. The distribution of this factor among industrially developed countries in the "beer," "wine" and "vodka" belts (based on the alcoholic drink type which represents the largest amount of pure alcohol consumed in the country) is displayed in Figure 14.

Figure 14. Difference between female and male life expectancy (years) in industrially developed countries with alcohol consumption of more than 9 liters of pure alcohol per adult per year[36]



Note: Rho = + .79; p = .000000001.

This shows distinctively the divergence between beer, wine and vodka belts in terms of the difference between female and male life expectancy. Note that in abstemious Islamic countries

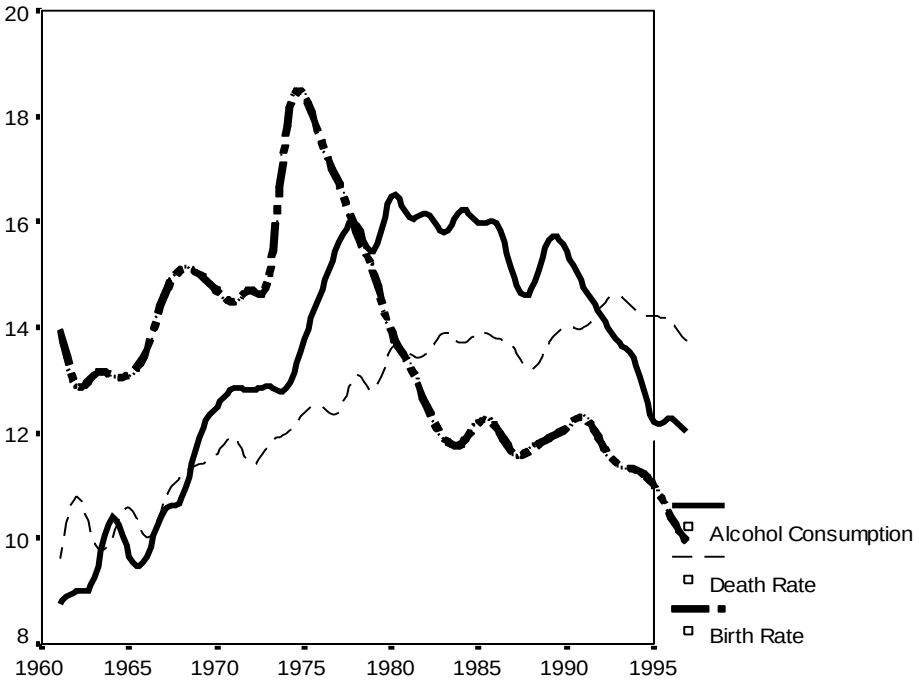
with developed health care systems, the difference between female and male life expectancy is only 3−5 years. In beer drinking countries this difference equals, on average, six years. It is a little higher in Finland and the Czech Republic where beer is predominant but hard liquor is also quite popular.[37] The difference between female and male life expectancy is 8 years in wine consuming, industrially developed countries.[38] The greatest gap between female and male life expectancy among the wine belt countries is in Hungary, where hard liquor is only a bit less popular than wine.[39]

However, the gap between female and male life expectancy is largest in the "vodka belt," where the average value of this parameter exceeds 10 years. The only exceptions are Slovakia and Moldova. In Slovakia the hard liquor component is comparable to the beer component in total alcohol consumption. The other exception is Moldova., which is traditionally a wine producing and wine consuming country; indeed, data from the Global Alcohol Database which represent Moldova as the world leader in consumption of hard liquor seem suspect.[40] In any case, the unfortunate position of leadership in the difference between female and male life expectancy belongs to Russia, where in 2002 this indicator was 13.5 years.[41]

In sum, based on the above-mentioned data, we may conclude that alcohol consumption is a major predictor of male mortality in industrially developed countries, and that the type of alcoholic beverages consumed is of major importance.[42] Wine, being a stronger alcoholic beverage, seems to have more harmful effect on a drinker's health than beer, and hard liquor is the most threatening factor for health and longevity.

Hungary provides another case study showing why abnormal mortality rates in countries with "demographic crosses" cannot be explained by economic troubles alone. The demographic cross took place in Hungary well before perestroika, against the background of impressive economic growth 1970–1980. As can be seen in Figure 15, the increase in mortality rates in Hungary was accompanied by a sharp growth in alcohol consumption.

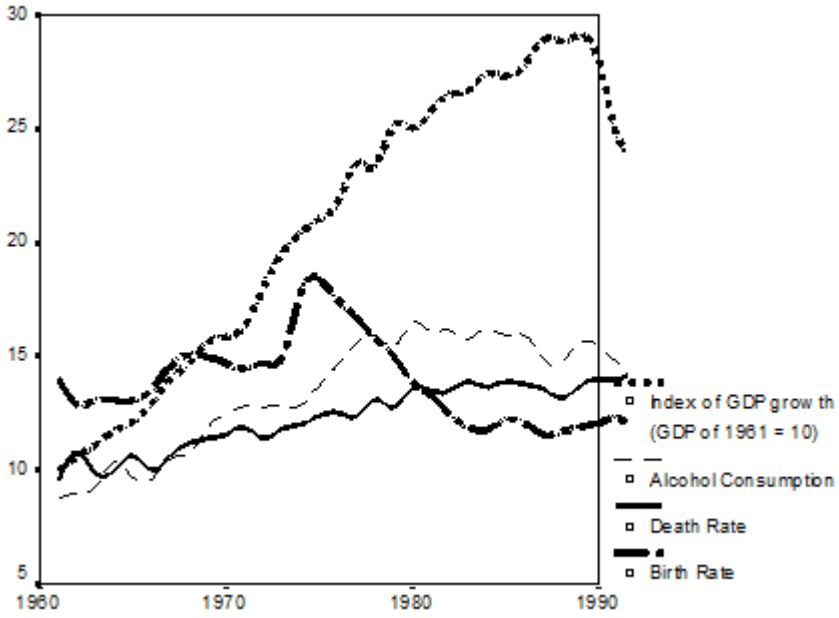
Figure 15. Birth rate, mortality rate (per 1000 people), and alcohol consumption (liters per adult per year) in Hungary in 1960–1995



Sources: World Bank, World Development Indicators, 2004; WHO, "Global Alcohol Database."

Successful economic reforms introduced by the Kádár regime during the 1960s and 1970s resulted in liberalization of the Hungarian economy, which led to fairly rapid economic growth. On the other hand, growth of the agricultural sector resulted in increased production of cheap wines and spirits. Between 1965 and 1985 alcohol consumption in Hungary tripled. As the following figure demonstrates, this resulted in a significant rise in mortality rates, which was accompanied by a sharp decline in fertility after 1976.

Figure 16. Birth rate, mortality rate (per 1000 people), and alcohol consumption (liters per adult per year) in Hungary against the background of GDP (index, GDP of 1961 = 10), 1960–1990



Sources: World Bank, World Development Indicators, 2004; WHO, "Global Alcohol Database."

The Russian demographic crisis took place against a background of economic decline (the GDP of Russian Federation decreased 1.79 times from 1989 to 1998). In contrast, the Hungarian cross occurred during the 1970s, a rather successful period of Hungarian economic history, when GDP rose by 58% – an exceptional achievement for socialist economies at that time. Yet what was common to Kádár's Hungary and Yeltsin's Russia was that in both cases, the radical liberalization of economy (including alcohol production and marketing) led to an unprecedented availability of alcoholic beverages in general, and hard liquor in particular. It is also crucial that both Russia of the 1990s and Hungary of the 1970s experienced a decline in alcohol costs relative to income.[43]

Drugs

Drug consumption is another significant factor behind the mortality crisis in Russia, resulting from an abrupt increase in addictive drug use during the 1990s.[44] According to the Russian drug control agency Gosnarkokontrol, the number of drug addicts in Russia is close to 4 million, while sociological surveys indicate that 13.9% of Russians 11 to 24 years old use addictive drugs of various kinds, of which 4.2% use opiates.[45] Heroin is a particularly lethal drug since addiction emerges after only 3–5 injections, and the majority of heroin addicts die at an early age (average life expectancy is only 7–10 years after starting to take drugs regularly). The chances of curing this addiction are extremely low, as leading clinics can only guarantee that about 10% of their patients will not start taking drugs again within one year after therapy (and obviously even some of those 10% will start taking heroin again later).[46] It follows that perhaps 4% of Russian]'s youth will not survive to reproduce because of heroin and other injected opiates.

Of course, opiates are not the only lethal drugs in Russia. Another group includes amphetamine-based injective drugs. Addiction to these drugs is even stronger than for heroin, and life expectancy for addicts is approximately 10 years. According to one survey, 0.8% of Russian young people consume amphetamine-based injective drugs.[47] In short, straightforward calculations suggest that Russia will loose at least 5% of its young population due to drugs.

Relative Impact of Factors: Statistical Analysis

Having identified a set of factors affecting Russian life expectancy, we performed multiple regression tests using cross-national data.[48] In order to avoid the effect of demographic and first epidemiological transitions, we selected a sample of countries with total fertility rates (TFR) of less than two children per woman.

Table 1. Regression model of male life expectancy factors for countries with TFR below 2 children per woman

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	70.728	1.312		53.896	$< 10^{-17}$
GDP per capita, USD PPP 2001	.00027	.00005	.536	5.769	.000004
Spirits consumption (liters per adult per year)	–.531	.152	–.348	–3.498	.002
Opiates, % of population 15–64 year consuming	–2.964	.992	–.244	–3.213	.003
Cocaine, % of population 15–64 year consuming				1.127	.270
Cannabis, % of population 15–64 year consuming				1.764	.090
Beer consumption (liters per adult per year)				– 1.543	.135
Wine consumption (liters per adult per year)				.364	.719
Cigarettes consumption per adult per year, 1992−2000				–.664	.512
Dependent Variable: Life expectancy at birth, male					

Note: $R = .936$; $R^2 = .876$; $p = .000000002$. We use a stepwise method of multiple regression.

Sources: UNDP, Human Development Report 2001; United Nations, World Drugs Report 2004; WHO, "Global Alcohol Database."

The R^2 value in the above data implies that this regression model explains over 87% of the overall data dispersion. This model shows that the most significant factor affecting male life expectancy is per capita GDP. This is in no way surprising: the value of GDP per capita affects the quality of life, average health expenditures, caloric consumption, nutritional quality, crime and stress levels, and so on. The data show that each dollar of GDP per capita adds about .00027 years of life for men. Thus, in order to increase life expectancy in a given country by one year, GDP per capita must increase by about $3700.[49]

However, the second strongest factor affecting male life expectancy is hard liquor consumption level. According to this model, each liter of hard liquor consumed by adults per year in a given country costs men a half year of longevity, on average.[50] Consequently, the average Russian man looses 5.5 years of life by consuming 11 liters of hard liquor in the form of vodka, *samogon,* and so on.[51]

This result is consistent with the calculations of other scholars based on different methodological foundations. According to Nemtsov, each liter of alcohol consumption above 8 liters of pure alcohol per adult per year (the maximum recommended by the World Health Organization) deprives men of 11 months and women of 4 months of their lives, on average. According to these studies alcohol decreases male life expectancy in Russia by 5.5 years.[52]

The above regression model interprets wine and beer as insignificant factors of life expectancy (the significance value for these variables exceeds the .05 level). Of course, excessive beer and wine consumption undoubtedly affects health and life expectancy negatively (as already discussed). However, the relative impact of hard liquor is so dramatic that, by comparison, they ap-

pear insignificant in the multiple regression analysis. The same could be referred for consumption of cigarettes, cocaine and cannabis.[53]

Our analysis shows that the third most powerful factor affecting male life expectancy is opiate consumption. According to our model, each percent of the population consuming opiates corresponds to a decrease of 3 years in average male life expectancy at birth. This is a huge value, and requires some additional comments.

Theoretically, a 1% level of injective opiate drug addicts in a given society should decrease average life expectancy at birth by less than half a year. However, it should affect male life expectancy almost twice as much, since the majority of addicts are men. Moreover, it should be noted that injective drugs increase mortality rates even among people who are not taking these drugs, by promoting the spread of HIV, syphilis, hepatitis, etc. Mortality might be also somewhat increased via the general criminalization accompanying widespread illegal drug use. In sum, increased opiate usage since the mid 1990s in Russia (and throughout the former socialist countries) is a powerful factor affecting young male mortality.[54]

Table 3 presents a regression model of the factors affecting life expectancy for women.

Table 2. Regression model of the factors of female life expectancy in the countries with TFR below 2 children per woman

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
	B	Std. Error	Beta		
Constant	73.828	.698		105.779	$< 10^{-15}$
GDP per capita, USD PPP 2001	.0002	.00004	.602	4.940	.00003
Spirits consumption (liters per adult per year)	–.369	.127	–.354	–2.903	.007
Opiates, % of population 15–64 year consuming				–1.241	.225
Cocaine, % of population 15–64 year consuming				–1.241	–1.241
Cannabis, % of population 15–64 year consuming				.046	.964
Beer consumption (liters per adult per year)				1.515	.141
Wine consumption (liters per adult per year)				–1.210	.237
Cigarettes consumption per adult per year, 1992−2000				.981	.335
Dependent Variable: Life expectancy at birth, female					

Note: $R = .882$; $R^2 = .778$; $p = .0000000007$.

Sources: UNDP, Human Development Report 2001; United Nations, World Drugs Report 2004; WHO, "Global Alcohol Database."

This model explains 77.8% of the data dispersion. According to the model, GDP per capita is the main factor of life expectancy for women too, with each dollar of GDP per capita adding .0002 years to average female life expectancy. The second most important factor is hard liquor consumption. Each liter of spirits consumed per adult per year corresponds to a .4 year decrease in female life expectancy. All other factors appear insignificant based on our model.

We also analyzed the effect of a country's economic situation, together with the consumption of beer, wine, hard liquor, cannabis, cocaine, opiates and cigarettes, on the difference between male and female life expectancy.

Table 3. Regression model of factors affecting the difference between male and female life expectancy, for countries with TFR below 2 children per woman

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
	B	Std. Error	Beta		
Constant	4.656	.400		11.639	$< 10^{-11}$
Spirits consumption (liters per adult per year)	.350	.086	.539	4.068	.0003
Opiates, % of population 15–64 year consuming	1.913	.684	.371	2.796	.009
GDP per capita, USD PPP 2001				–1.549	.133
Cocaine, % of population 15–64 year consuming				–1.976	.058
Cannabis, % of population 15–64 year consuming				–.625	.537
Beer consumption (liters per adult per year)				–.117	.908
Wine consumption (liters per adult per year)				1.164	.255
Cigarettes consumption per adult per year, 1992−2000				.927	.362
Dependent Variable: Difference between female and male life expectancy at birth, years					

Note: $R = .780$; $R^2 = .609$; $p = .000002$.

Sources: UNDP, Human Development Report 2001; United Nations, World Drugs Report 2004; WHO, "Global Alcohol Database."

The only significant factors explaining the difference between male and female life expectancy are consumption of hard liquor and opiates. All other factors, such as GDP per capita and the consumption of beer, wine, cigarettes, cocaine, and cannabis were considered as insignificant within the scale of research. According to the model, each liter of hard liquor consumption per capita per year increases the gap between female and male life expectancy by 3.5 years, and each percentage of the population taking opiates accounts for 1.9 years of this gap.

There is also reason to expect that excessive male mortality is an independent factor contributing to low fertility. High mortality among males of reproductive age automatically increases the percentage of small families, and also should result in a growing percentage of single women who have no (or few) children.[55] Moreover, one might speculate that sharply rising male mortality leads women to doubt whether their husbands will be able to support them through the critical period before and after childbirth (especially if their husbands are heavy drinkers or drug addicts). In such situations, women may be unlikely to risk giving birth to a third, second or even first child.

Table 5 presents a multiple regression test of the hypothesis that excessive male mortality contributes to low fertility, as well as the suppositions that fertility rates are influenced by GDP per capita, total employment, female employment, higher education among women, and level of urbanization.

Table 4. Regression model of factors affecting fertility (TFR), in countries with TFR below two children per woman

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
	B	Std. Error	Beta		
Constant	1.996	.128		15.620	$< 10^{-15}$
Difference between female and male life expectancy, years	–.075	.018	–.544	–4.256	.0001
GDP per capita, USD PPP 2001				.883	.382
Female employment, % 2001				–.522	.605
Female tertiary school enrollment (% gross), 2000−2002[56]				–.840	.406
Unemployment, total (% of total labor force) 2000−2002[57]				–.435	.666
Urbanization, %				–.680	.500
Dependent Variable: Total fertility rate					

Note: $R = .549$; $R^2 = .301$; $p = .0001$.

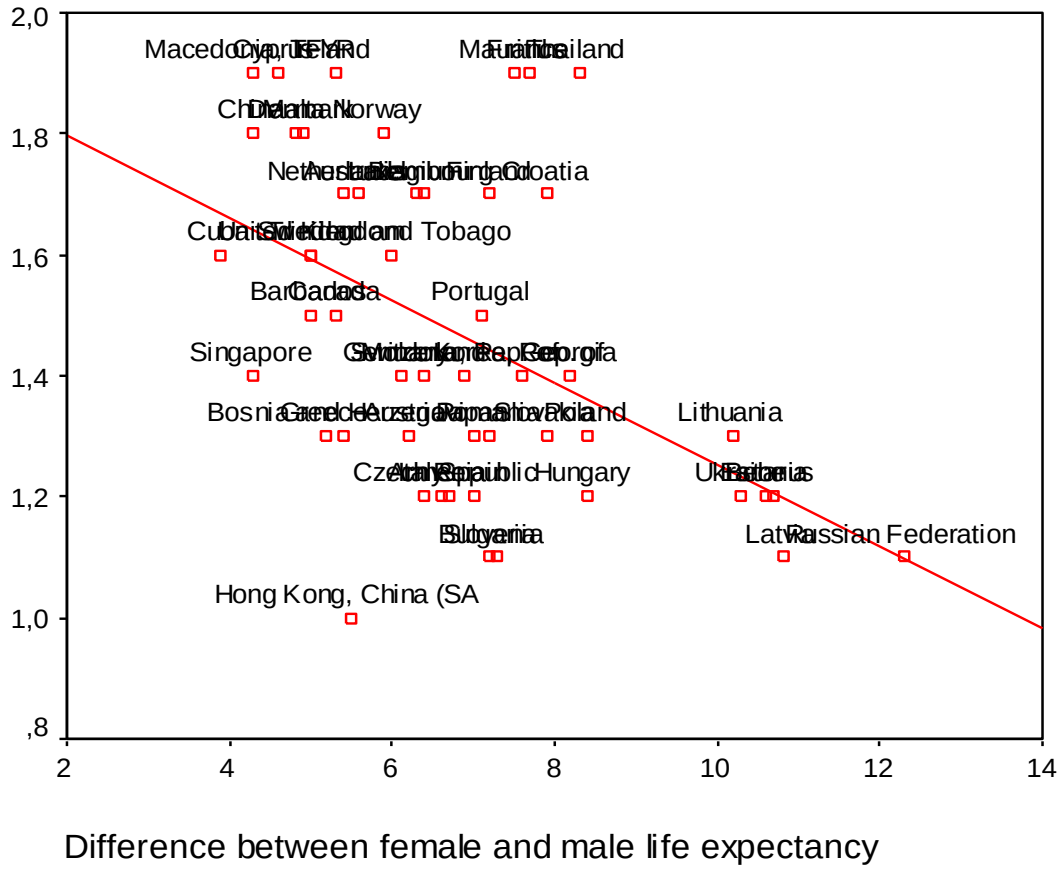
Sources: UNDP, Human Development Report 2001; United Nations, World Drugs Report 2004; WHO, "Global Alcohol Database."

This multiple regression test identifies the difference between male and female life expectancy as the only significant factor negative affecting fertility for the countries in question. According to the model, each year of difference between female and male life expectancy corresponds to a decline in total fertility rate of .08 children per woman. All other factors, such as GDP per capita,

employment, female employment, higher education among women and urbanization level, are insignificant. This implies that economic growth will be insufficient to meet the low fertility challenge in Russia unless the problems of alcohol and injective drugs are resolved.[58]

The relationship between the two parameters can be identified with correlation analysis as well.

Figure 17. Total fertility rate and the difference between female and male life expectancies, in countries with TFR below 2 children per woman



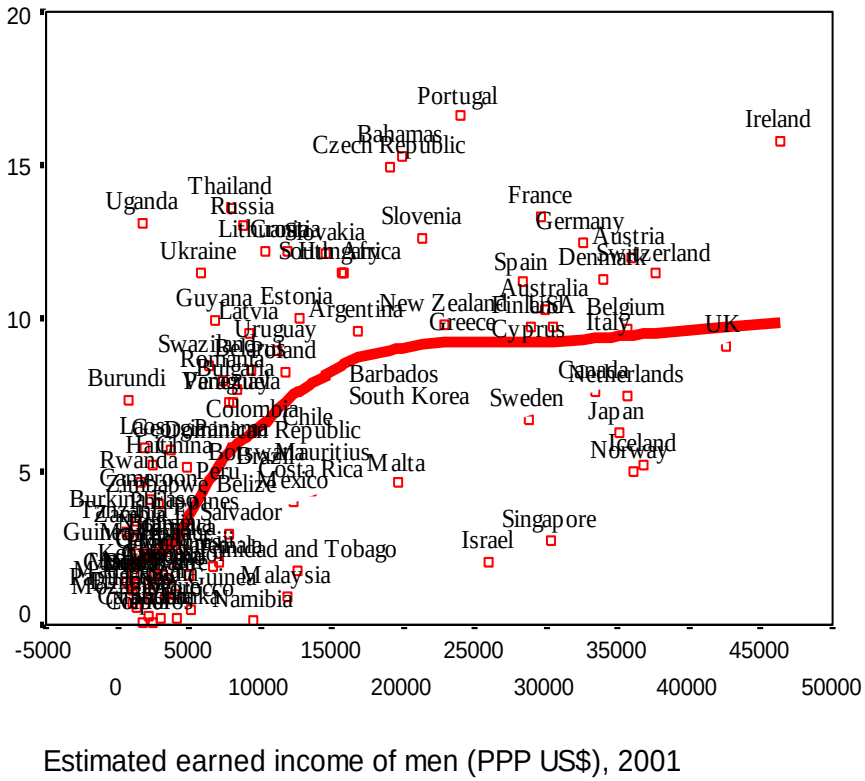
Note: $r = -.48$; $p = .0002$.

Sources: UNDP, Human Development Report 2001; WHO, "Global Alcohol Database."

We conclude that excessive male mortality (resulting in a large gap between female and male life expectancies) is a major independent factor affecting fertility decline. Furthermore, high alcohol consumption – especially in the form of hard liquor – as well as injective drug use cause excessive male mortality in Russia (and other countries), and thus negatively affect fertility level. At the same time, since lethal drugs and excessive vodka drinking also kills young women, they affect fertility directly as well.

There is no reason to believe that a high level of alcohol consumption is caused by economic crisis; cross-national data do not support such a hypothesis. In Hungary, alcohol consumption rose to a dangerous level in the context of economic growth. Figure 18 presents the distribution of alcohol consumption by GDP per capita levels in 2001 (Islamic countries are excluded). As one can see, alcohol consumption is insignificant in the poorest countries because population in these countries simply has no possibility to spend a lot of resources on purchasing or producing alcohol:

Figure 18. Alcohol per capita consumption and average estimated income for men (USD PPP 2001)



Sources: UNDP, Human Development Report 2001; WHO, "Global Alcohol Database."

As we see, in general a growth of economic surplus leads to rising alcohol consumption.[59] However, after a country reaches a certain level of GDP per capita, alcohol consumption increases to what might wryly be called saturation level. In fact, some decline in alcohol consumption can be observed among developed countries.

Alcoholization of Russia followed the same scenario as in the rest of the world. The main specifics of Eastern Europe is that the most popular type of alcohol happens to be hard liquor. Moreover, the largest growth in alcohol consumption in Russia took place in the 1960s and 1980s, when Soviet per capita income increased substantially. The greater economic availability of alcohol was the leading factor behind this growth in consumption.

Much the same might be said about drug use. In the early 1990s, countries around the "Golden Triangle" in South East Asia (where large opium poppy plantations were located) had the most serious problems with heroin abuse in the world. Since the early 1990s opiate production has been growing in Afghanistan, where yields are three times higher than in the Golden Triangle.[60] As a result, the number of heroin-related deaths has decreased in South East Asia and catastrophically increased in the CIS, the region directly adjacent to Afghanistan.[61] Consequently, the narcotic epidemic in Russia has been caused not simply by economic crisis, but (primarily) by a rapid increase in the availability of drugs after the collapse of the Soviet Union, itself partly a function of the weakness of state institutions.

Conclusions

To briefly review our major findings, the main factors of excessive mortality in Russia are spirit and drug (especially injective drug) consumption; the post-Perestroika economic crisis affected mortality much less substantially. In Russia between 1990 and 2001, alcohol alone caused the deaths of roughly seven million people, which exceeds the number of deaths caused by terrorist attacks (outside of Chechnya) by several thousand times. This was especially due to the consumption of hard liquor, which affects mortality far more powerfully than wine and beer consumption. Drug use was a significant additional factor responsible for these ravages, and at this point at least 5% of Russia's young population are doomed to die at an early age due to opiate and ephedrine based drug use. Finally, by causing excessive male mortality, hard liquor and injective drugs consumption also contribute to low fertility. The notorious "Russian cross" is explained by these factors. In sum, hard liquor and drugs constitute real threats to national security.

We also find that the economic crisis is not the only (or even the main) cause of the recent epidemic of alcoholism and narcotic addiction in Russia. Rather, these processes occurred

against the background of growing availability of alcohol and drugs, as well as the weakness of government policies regarding substance control. Thus, although economic growth might conceivably lead to some decline in mortality and growth in fertility, economic growth alone will be insufficient to solve Russia's demographic crisis. On the contrary, it is impossible to solve the demographic crisis without reducing the consumption of high-alcohol beverages and opiate/ephedrine based drugs.

Of course, the ultimate solution of demographic crisis in Russia lies in the sphere of family policy. Western countries achieved limited success in stimulating fertility by increasing financial support for families (especially poor families), third child subsidies, etc.[62] However, these and other expensive measures will have little effect until the major "black holes" of Russian mortality – vodka-type alcohol consumption and injective drug use – are eliminated. This suggests the importance of introducing measures to radically reduce consumption of these substances.[63]

Our analysis leads us to expect that a significant reduction of hard liquor and drug consumption would not only lead to a radical decline in mortality, but would also have the following positive social consequences: a decline in the rate of murders, rapes, robberies, car hijackings and other crimes, as well as in the rates of suicides, accidents, divorces and abortions. It would also help decrease expenditures on subsidies to single mothers, orphans and invalids. Introduction of more moderate forms of alcohol consumption would probably also lead to alleviation of the homelessness problem. Moreover, the Russian economy would experience a net benefit from a reduction in hard liquor production, sales and consumption, because this would probably lead to a decline in absenteeism and work-related accidents (some of the loss of tax revenue would presumably be offset by an increase in tax revenues from beer and wine production). However, the most significant effect would be a dramatic growth in returns from human capital investment, since (as argued by Konstantinov and Filonovich in their chapter) human capital is the major factor behind modern economics growth.[64]

In keeping with the main themes addressed in this volume, it is worth concluding by considering the role of identity and globalization in Russia's ongoing security problem. First, it should be noted that vodka was not always an integral part of Russian identity and everyday culture. It was only introduced in the sixteenth century. At that time, vodka was largely a source of state tax revenue; under Ivan the Terrible, a network of drinking houses (*kabaks*) was created for this purpose. Still, before the 1917 Revolution, alcohol consumption per adult was three times lower than today, and frequent cases of excessive drinking were balanced by a popular temperance movement.[65]

The increase in vodka production was a goal set by Stalin:

> [T]wo words about … vodka. There are people who think that it is possible to build socialism in white gloves. It is the rudest mistake, comrades. Since we do not have loans, since we are poor with capitals, and besides, we cannot go into debt servitude to West European capitalists, we cannot accept those . . . conditions which they offer us, and which we have denied. The only thing to do is to look for other sources . . . Here we have to choose between debt servitude and vodka, and people who think that it is possible to build socialism with white gloves make a serious mistake.[66]

In a conversation with foreign laborers in 1927, Stalin declared that state vodka production was a temporary measure which would be stopped as soon as possible.[67] However, in a private letter to Molotov in 1930, he called for maximally increasing vodka production.[68] Even beyond revenue generation, the drink came to be seen as a necessary social support in times of duress. A decree issued by the State Defense Committee in August 1941 prescribed 100 grams of vodka for

every Soviet soldier on the front lines. Vodka subsequently became a symbol of Soviet fortitude during the war, and in the process it penetrated deeply into Russian identity. Indeed, in a study conducted among Russian students in 1999, we found that vodka placed second (after Pushkin) on a list of most frequent associations with "Russian culture."[69] At this point vodka has at least a partly positive connotation in Russian culture; for example, masculine movie heroes drink together to express their respect for each other.

Against this background, globalization could potentially play a constructive role with respect to Russia's demographic crisis. As has already been mentioned, vodka has come to be regarded by an alarmingly high percentage of Russians as an integral part of national identity. In this respect, some "dilution" of this aspect of Russian identity due to globalization and westernization might positively impact Russian demography, especially if it takes the form of a shift away from vodka to wine and beer. According to some sources, beer consumption has become much more popular among younger Russians in recent years, squeezing out vodka from this market share; not surprisingly, the mortality rate for young Russians has declined modestly since 2000.[70] On the other hand, globalization could also have – indeed, has already had – a negative impact. Perestroika, with its openness to the West, led to the diffusion of teen subcultures and countercultures, including the tolerance and even propagation of drug use. Such drug use became widespread among Russian youth after the fall of the Iron Curtain. Since then, Russia's inclusion in global drug trafficking networks has further exposed the Trojan Horse of globalization.

Appendix Mortality Rate Dynamics, 1990–1994 (Summary table)

Russia			**Estonia**		
20–24 year old females	Mortality rate in 1990	.71	20–24 year old females	Mortality rate in 1990	.71
	Mortality rate in 1994	1.0		Mortality rate in 1994	1.50
	Mortality rate change between 1990 and 1994	+.29		Mortality rate change between 1990 and 1994	+0.79
20–24 year old males	Mortality rate in 1990	2.6	20–24 year old males	Mortality rate in 1990	2.6
	Mortality rate in 1994	4.0		Mortality rate in 1994	3.8
	Mortality rate change between 1990 and 1994	+1.4		Mortality rate change between 1990 and 1994	+1.6
25–39 year old females	Mortality rate in 1990	1.13	25–39 year old females	Mortality rate in 1990	1.02
	Mortality rate in 1994	1.95		Mortality rate in 1994	1.85
	Mortality rate change between 1990 and 1994	+0.82		Mortality rate change between 1990 and 1994	+0.83
25–39 year old males	Mortality rate in 1990	4.38	25–39 year old males	Mortality rate in 1990	3.76
	Mortality rate in 1994	8.08		Mortality rate in 1994	6.58
	Mortality rate change between 1990 and 1994	+3.7		Mortality rate change between 1990 and 1994	+2.82
40–59 year old females	Mortality rate in 1990	5.04	40–59 year old females	Mortality rate in 1990	4.52
	Mortality rate in 1994	7.71		Mortality rate in 1994	6.5
	Mortality rate change between 1990 and 1994	+2.67		Mortality rate change between 1990 and 1994	+1.98
40–59 year old males	Mortality rate in 1990	14.35	40–59 year old males	Mortality rate in 1990	13.58
	Mortality rate in 1994	24.11		Mortality rate in 1994	20.07
	Mortality rate change between 1990 and 1994	+9.76		Mortality rate change between 1990 and 1994	+6.49

Georgia			**Armenia**		
20–24 year old females	Mortality rate in 1990	0.63	20–24 year old females	Mortality rate in 1990	0.46
	Mortality rate in 1994	0.59		Mortality rate in 1994	0.57
	Mortality rate change between 1990 and 1994	– 0.04		Mortality rate change between 1990 and 1994	+ 0.11
20–24 year old males	Mortality rate in 1990	1.50	20–24 year old males	Mortality rate in 1990	1.17
	Mortality rate in 1994	2.25		Mortality rate in 1994	2.84
	Mortality rate change between 1990 and 1994	+0.75		Mortality rate change between 1990 and 1994	+ 1.67
25–39 year old females	Mortality rate in 1990	0.90	25–39 year old females	Mortality rate in 1990	0.91
	Mortality rate in 1994	0.94		Mortality rate in 1994	0.76
	Mortality rate change between 1990 and 1994	+ 0.04		Mortality rate change between 1990 and 1994	– 0.15
25–39 year old males	Mortality rate in 1990	2.68	25–39 year old males	Mortality rate in 1990	2.15
	Mortality rate in 1994	3.44		Mortality rate in 1994	3.05
	Mortality rate change between 1990 and 1994	+ 0.76		Mortality rate change between 1990 and 1994	+ 0.90
40–59 year old females	Mortality rate in 1990	4.28	40–59 year old females	Mortality rate in 1990	4.14
	Mortality rate in 1994	4.22		Mortality rate in 1994	3.51
	Mortality rate change between 1990 and 1994	– 0.06		Mortality rate change between 1990 and 1994	– 0.63
40–59 year old males	Mortality rate in 1990	10.52	40–59 year old males	Mortality rate in 1990	9.38
	Mortality rate in 1994	10.24		Mortality rate in 1994	8.95
	Mortality rate change between 1990 and 1994	– 0.28		Mortality rate change between 1990 and 1994	– 0.43

Uzbekistan			**Ukraine**		
20–24 year old females	Mortality rate in 1990	0.93	20–24 year old females	Mortality rate in 1990	0.61
	Mortality rate in 1994	1.09		Mortality rate in 1994	0.77
	Mortality rate change between 1990 and 1994	+0.16		Mortality rate change between 1990 and 1994	+0.16
20–24 year old males	Mortality rate in 1990	1.47	20–24 year old males	Mortality rate in 1990	2.60
	Mortality rate in 1994	1.48		Mortality rate in 1994	4.01
	Mortality rate change between 1990 and 1994	+0.01		Mortality rate change between 1990 and 1994	+1.41
25–39 year old females	Mortality rate in 1990	1.33	25–39 year old females	Mortality rate in 1990	1.04
	Mortality rate in 1994	1.62		Mortality rate in 1994	1.39
	Mortality rate change between 1990 and 1994	+0.29		Mortality rate change between 1990 and 1994	+0.35
25–39 year old males	Mortality rate in 1990	2.47	25–39 year old males	Mortality rate in 1990	3.57
	Mortality rate in 1994	2.61		Mortality rate in 1994	5.11
	Mortality rate change between 1990 and 1994	+0.14		Mortality rate change between 1990 and 1994	+1.54
40–59 year old females	Mortality rate in 1990	5.48	40–59 year old females	Mortality rate in 1990	4.84
	Mortality rate in 1994	6.11		Mortality rate in 1994	6.14
	Mortality rate change between 1990 and 1994	+0.63		Mortality rate change between 1990 and 1994	+1.3
40–59 year old males	Mortality rate in 1990	10.22	40–59 year old males	Mortality rate in 1990	13.10
	Mortality rate in 1994	10.67		Mortality rate in 1994	17.38
	Mortality rate change between 1990 and 1994	+0.45		Mortality rate change between 1990 and 1994	+4.28

Source: UNICEF, Innocenti Social Monitor 2004 (Florence: UNICEF Innocenti Research Centre, 2004).

NOTES

[1] For more detail see Andrey Korotayev, A. Malkov, and Darya Khalturina, Introduction to Social Macrodynamics: Compact Macromodels of the World System Growth (Moscow: KomKniga/URSS, 2006).

[2] Ibid.

[3] Ibid.

[4] See for example N. Rimashevskaya, "Russkiy krest," Priroda 6 (1999): 3–10; V. Shkol'nikov and V. V. Chervyakov, eds., Politika po kontrolyu krizisnoy smertnosti v Rossii v perekhodnyy periode (Moscow: Programma razvitiya OON, Rossiya, 2000); J. DaVanzo and G. Grammich, Dire Demographics: Population Trends in the Russian Federation (Santa Monica, CA: RAND, 2001); I. A. Gundarov, "Dukhovnoye neblagopoluchiye i demograficheskaya katastrofa," Obshchestvennye nauki i sovremennost' 5 (2001): 58−65; I.A. Gundarov, "Demograficheskaya katastrofa v Rossii: prichiny i puti preodoleniya," in Bestuzhev-Lada et al, Pochemu vymirayut russkie (Moscow: Eksmo, 2004); Prokhorov, B. B., "Zdorov'ye rossiyan za 100 let," Chelovek 2 (2002): 54–65; Brainerd, E. and D. Cutler. "Autopsy of the Empire: Understanding Mortality in Russia and the Former Soviet Union," unpublished paper, 2005, available at: http://www.wcfia.harvard.edu/conferences/demography/papers/Brainerd.pdf.

[5] A. G. Vishnevskiy and V. Shkol'nikov, Smertnost' v Rossii: Glavnyye gruppy riska i prioritety deystviy (Moscow: Moskovskiy Tsentr Karnegi, 1997).

[6] J. L. Bobadilla, Ch. Costello, and F. Mitchell, eds., Premature Death in New Independent States (Washington DC: National Academy Press, 1997); E. Shcherbakova, "Narkomaniya ugrozhayet bezopasnosti strany," Naseleniye i obshchestvo 60 (December 2001), available at: http://www.demoscope.ru/ acrobat/ps60.pdf.

[7] O. J. Skog, "Public Health Consequences of J-Curve Hypothesis of Alcohol Problems," Addiction 91 (1996): 325–336; D. A. Leon et al, "Huge Variation in Russian Federation Mortality Rates 1984–1994: Artifact, Alcohol or What?" Lancet 350 (1997): 383–388; L. Chenet et al, "Alcohol and Cardiovascular Mortality in Moscow: New Evidence of a Causal Association," Journal of Epidemiology and Community Health, 52 (1998): 772-774; Martin McKee and A. Britton, "The Positive Relationship between Alcohol and Heart Diseases in Eastern Europe: Potential Physiological Mechanism," Journal of the Royal Society of Medicine 91 (1998): 402−407; Shkol'nikov and Chervyakov, op. cit; DaVanzo and Grammich, op. cit; A. V. Nemtsov, Alkogol'naya smertnost' v Rossii 1980–90-e gg. (Moscow: NALEX, 2001); A.V. Nemtsov, "Alkogol'naya smertnost' v Rossii," Naselenie i obshchestvo 78 (2003), available at: http://www. demoscope.ru/acrobat/ps78.pdf; A.V. Nemtsov, Alkogol'nyi uron regionov Rossii (Moscow: NALEX, 2003); Prokhorov, op. cit; Brainerd and Cutler, op. cit; WHO, Global Status Report on Alcohol (Geneva: World Health Organization, 2004), 2; Yegor T. Gaydar, Dolgoye vremya. Rossiya v mire: Ocherki ekonomicheskoy istorii (Moscow: Delo, 2005).

[8] World Bank, World Development Indicators (Washington, DC: World Bank, 2004).

[9] A. Maddison, Monitoring the World Economy: A Millennial Perspective (Paris: OECD, 2001), 341.

[10] Ibid.

[11] Ibid.

[12] Andrey Korotayev and Darya Khalturina, Introduction to Social Macrodynamics: Secular Cycles and Millennial Trends in Africa (Moscow: KomKniga/URSS, 2006).

[13] Maddison, op. cit., 341

[14] In fact, the relative contribution of the growing child mortality was even much smaller than 17% ([7.2/40.2] multiplied by 100), because, due to a very low birth rate, children under 5 consti-

tuted a very small fraction of the total population. In addition, its proportion decreased very significantly during 1990–1994 due to a dramatic decline in birth rates. See UNICEF, Innocenti Social Monitor 2004 (Florence: UNICEF Innocenti Research Centre, 2004), 115.

[15] The source for the following three figures is Ibid, 68.

[16] Ibid, 74–76.

[17] The source for the following three figures is Ibid, 73–75.

[18] Quite predictably, Kazakhstan in this respect occupies an intermediate position between the European and Central Asian parts of the former USSR, while Tajikistan combines features of Central Asian and Transcaucasian patterns, as the mortality crisis in this country in the early 1990s is accounted for primarily by internal warfare dynamics. Ibid, 73–76.

[19] On the other hand, the fact that unlike in Armenia, Georgia, Azerbaijan and Tajikistan male mortality in the first cluster countries increased much more in the non-fighting age groups than in fighting age ones indicates that military-political instability was not a major cause of the male mortality increase either.

[20] Shkol'nikov and Chervyakov, op. cit., 18, citing C. Davis, "Economic Transition, Health Production and Medical System Effectiveness in the Former Soviet Union and Easter Europe," paper presented at the Project Meeting on Economic Shocks, Social Stress and the Demographic Impact, Helsinki, 17−19 April, 1997. See also J. Shapiro, "Russian Health Care Policy and Russian Health," Russian Political Development (London: Macmilllan, 1997); and UNDP, Human Development Report 1995 (New York: Oxford University Press, 1995).

[21] Note that alcohol consumption increases the probability of hemorrhagic stroke. See for example P. Anderson, "Alcohol and Risk of Physical Harm," in H. D. Holder and G. Edwards, eds., Alcohol and Public Policy: Evidence and Issues (Oxford: Oxford University Press, 1995), 93−97.

[22] WHO, "World Mortality Database," see table for Number of Registered Deaths: The Russian Federation, at: http://www.who.int/healthinfo/morttables/en/index.html.

[23] E. Andreev et al, "The Evolving Pattern of Avoidable Mortality in Russia," International Journal of Epidemiology 32 (2003): 437-446; World Bank, op. cit.

[24] Breinerd and Cutler, op. cit., 12. The two major factors in Breinerd and Cutler's model are alcohol consumption and male suicide rate. We argue that it is incorrect to include male suicide rates into the analysis as an independent variable, since suicide rate is significantly influenced by alcohol consumption. On this point see, for example, S. Andreésson, P. Allebeck, and A. Rosmelsjö, "Alcohol and Mortality among Young Men: Longitudinal Study of Swedish Conscripts," British Medical Journal 296 (1988): 1021−1025; O. J. Skog, "Alcohol and Suicide − Durkheim Revised," Acta Sociologica 34 (1991): 193−206; D. R. English et. al, Quantification of Drug Cause Morbidity and Mortality in Australia, 1992 (Canberra: Commonwealth Development of Human Services and Health, 1995); A. Romelsjö, "Alcohol Consumption and Unintentional Injury, Suicide, Violence, Work Performance and Intergenerational Effect," in H. D. Holder and G. Edwards, eds., Alcohol and Public Policy: Evidence and Issues (Oxford: Oxford University Press, 1995), 126−128; I. Rossow, K. Pernanen, and J. Rehm, "Accidents, Suicides and Violence," in I. Klingemann and G. Gmel, eds., Mapping the Social Consequences of Alcohol Consumption (Dordreht: Kluwer Academic Publishers, 2001), 93−112; WHO, op. cit, 39−42. Social depression is an additional factor; however, when Breinerd and Cutler included a direct measure of social pessimism in their analysis, and it turned out to be insignificant.

[25] See also Darya Khalturina and Andrey Korotayev, "Zakony istorii: Kompaktnye makromodeli evolyutsii Mir-sistemy. Demografiya, ekonomika, voyny," in Ekskurs 8. Puti preodoleniya demograficheskogo krizisa v Rossii (Moscow: URSS, 2005), 291−323.

[26] A. G. Vishnevskiy and V. Shkol'nikov, Smertnost' v Rossii: Glavnyye gruppy riska i prioritety deystviy (Moscow: Moskovskiy Tsentr Karnegi, 1997); Shkol'nikov and Chervyakov, op. cit. As is clear from Figures 7–9 (and the Appendix), in 1990–1994 the mortality rate among Russian working age males increased far more than child mortality. On the other hand, in 1990–1994 the mortality rate among 60+ years old Russians grew by 22% as compared to 84% growth among 25–39 year old Russian males. UNICEF, op. cit., 76. Note that these were Russian pensioners whose incomes declined catastrophically during this period, whereas the incomes of working age males decreased much less. This in itself indicates that rising poverty was not the main cause of the Russian mortality crisis.

[27] WHO, Global Alcohol Database." These data indicate the volume of pure alcohol in drinks. One liter of pure alcohol corresponds to 5 half-liter bottles of vodka, 20 such bottles of 10% wine and 50 bottles of 4% beer.

[28] Ibid.

[29] A. K. Demin and I. A. Demina, "Zdorov'ye naseleniya i alkogol'naya epidemiya v Rossii: lekarstvo ot zhizni?" in A.K. Demin, ed., Alkogol' i zdorov'e naseleniya Rossii 1900-2000 (Moscow: Rossiyskaya Assotsiatsiya obshchestvennogo zdorov'ya, 1998), 15; Nemtsov, Alkogol'naya smertnost', op. cit., 7.

[30] Nemtsov, Alkogol'naya smertnost', op. cit.; Idem, "Alkogol'naya smertnost'," op. cit.; Idem, Alkogol'nyi uron, op. cit.

[31] Nemtsov, "Alkogol'naya smertnost'," op. cit.; Nemtsov, Alkogol'nyi uron, op. cit.

[32] Dead men who died from infectious diseases, neoplasm and unclear causes were not taken into account. Shkol'nikov and Chervyakov, op. cit., 117.

[33] Leon et al, op. cit.

[34] D. Wasserman and A. Varnik, "Reliability of Statistics on Violent Death and Suicide in the Former USSR, 1970-1990," Acta Psychiatry-Scand Supplement 394 (1998): 34-41.

[35] Nemtsov, "Alkogol'naya smertnost'," op. cit.; Nemtsov, Alkogol'nyi uron, op. cit.

[36] Note that we selected only countries with alcohol consumption of more than 9 liters of pure alcohol per adult per year. The data on life expectancy are from UNDP Human Development Report 2001. Data on alcohol consumption are from WHO, "Global Alcohol Database." The structure of alcohol consumption in Latvia, which is not specified in WHO database, was taken from A. Brunovskis and T. Ugland, "Alcohol Consumption in the Baltic States," Fafo-paper 4, Oslo, 2003, available at: http://www.fafo.no/pub/rapp/702/702.pdf, 14). Data on Ukraine was corrected according to data from A. I. Minko, "Alkogolizm − mezhdistsiplinarnaya problema (vyyavleniye, lecheniye, reabilitatsiya, profilaktika)," Ukrains'kiy visnik psikhonevrologii 9 (2001): 6–7. Brunovskis and Ugland convincingly argue that alcohol consumption in Estonia is underestimated in the WHO database. Estonia is therefore classified as a country with alcohol consumption exceeding 8 liters of pure alcohol per adult per year.

[37] I.e., with per adult consumption of 3 liters of pure alcohol per year in the form of spirits. WHO, "Global Alcohol Database."

[38] The value of this parameter is the smallest in Greece and Cyprus. However, it is possible that the data on alcohol consumption in these countries is exaggerated because a substantial part of alcoholic drinks sold in Greece and Cyprus is consumed by tourists, and these countries might best be excluded from the analysis.

[39] WHO, "Global Alcohol Database."

[40] Ibid. At the same time, demographic data on Moldova show a sharp rise in the mortality rate in 2004, which might be partly related to increasing consumption of spirits. World Bank, op. cit.

[41] UNICEF, op. cit., 72–73.

[42] Spearman's coefficient for the correlation between the prevailing type of alcoholic beverages (ordinally arranged), on the one hand, and the difference between female and male life expectancy, on the other, is +.79.

[43] Nemtsov, Alkogol'naya smertnost', op. cit.

[44] According to the UN Drugs and Crime Office, 2.1% of the Russian population used opiates in 2001, 3.9% used cannabis, and about .1% used amphetamines, cocaine and ecstasy. United Nations, World Drugs Report 2004, vol. 2, available at: http://www.unodc.org/unodc/en/world_drug_report.html, 195−208.

[45] F. E. Sheregi and A. L. Aref'ev, Otsenka narkosituatsii v srede detey, podrostkov i molodezhi (Moscow: Optim Grupp, 2003).

[46] I. N. Pyatnitskaya, Klinicheskaya narkologiya (Moscow: Meditsina, 1975).

[47] Sheregi and Arefjev, op. cit.

[48] It should be acknowledged, following Bongaarts and Feeney, that the traditional formula used to calculate life expectancy at birth has certain flaws: it tends to exaggerate life expectancy when it increases and to understate it when it declines. As a result, life expectancy is overestimated a year and a half for the US and Sweden, and 2.4 years for France. J. Bongaarts and G. Feeney, "Estimating Mean Lifetime," Proceedings of the National Academy of Sciences 100 (2003): 13127–13133.

[49] Measured by purchasing power parity, using 2001 dollars.

[50] The value of this coefficient and its significance survives replication of the test with a sample of Western countries only.

[51] A. V. Nemtsov, Alkogol'naya situatsiya v Rossii (Moscow: NALEX, 1995).

[52] Ibid.

[53] There is no doubt that smoking is one of a most serious negative health factors, and has a significant impact on excessive mortality in Russia and globally. C. J. Murray and A. Lopez, The Global Burden of Disease (London: Oxford University Press, 1996). The absence of a significant relationship in our analysis can probably be attributed to the lagged effect of tobacco on mortality. Besides, Brainerd and Cutler (op. cit.) point out that the smoking rate has increased only slightly in Russia since the Soviet collapse. Therefore, smoking *per se* cannot be considered a major factor in the catastrophic Russian mortality crisis of the 1990s. One should keep in mind the possibility of an interaction between greatly increased hard liquor consumption and high (but not much increased) tobacco consumption. However, this issue requires additional research.

[54] For example, the number of registered HIV cases in the former Soviet Union and the number of registered drugs addicts per 100000 people grew until the year 2001. United Nations, World Drug Report, op. cit., vol. 1, 86. This suggests that the rate of drug-related deaths will grow for another decade, even were stabilization to occur.

[55] Excessive alcohol use is also known to cause reproductive health problems for men. Nemtsov, Alkogol'naya situatsiya, op. cit.

[56] World Bank, op. cit.

[57] Ibid.

[58] Of course, there are other factors affecting the fertility rate after demographic transition which were not included in our analysis, such as demographic waves, housing availability, labor migrations, socio-psychological attitudes, etc.

[59] See also R. Weeden, "Alcohol Studies from an Economic Perspective," in G. Marcus and A. Plant, eds., Economics and Alcohol (New York: Gardner Press, 1983), 37.

[60] Afghanistan is now the world leader in the heroin production. The production of opiates in the Golden Triangle considerably declined due to competition with Afghan producers and the anti-drug policies of South East Asian states. United Nations, op. cit., vol. 1, 87.

[61] Ibid, 61.

[62] A. H. Gauthier, The State and the Family (Oxford: Clarendon Press, 1996).

[63] Shkol'nikov and Chervyakov, op. cit., 129.

[64] See also V. A. Mel'yantsev, Vostok i Zapad vo vtorom tysyacheletii (Moscow: MGU, 1996); Idem, "Tri veka rossiyskogo ekonomicheskogo rosta," Obshchestvennye nauki i sovremennost' 5 (2003): 84–95; Idem, Genezis sovremennogo (intensivnogo) ekonomicheskogo rosta (Moscow: Gumanitariy, 2004).

[65] Nemtsov, Alkogol'nyi uron, op. cit.

[66] I. V. Stalin, "Politicheskiy otchet tsentral'nogo komiteta. 18 dekabrya 1925 g.," Sochineniya, vol. 7 (1925).

[67] I. V. Stalin, "Beseda s inostrannymi rabochimi delegatsiyami. 5 noyabrya 1927 g.," Sochineni-ya, vol. 10 (1927).

[68] I. V. Stalin, Pis'ma I. V. Stalina V. Molotovu. 1925−1936 gg. (Moscow: Rossiya molodaya, 1995).

[69] Darya Khalturina and Andrey Korotayev, "Concepts of Culture in Cross-National and Cross-Cultural Perspectives, or 'Cognitive World Maps' of American and Russian Students," World Cultures 12 (2001).

[70] For consumption trends see, e.g., Dymshits, "Pobeda PR nad razumom," Paper delivered at the conference, "New Electoral Technology," Moscow, 8-9 July, 2004 (based on the TNS/Gallop "Marketing Index" for 1997−2003). For mortality rates among young Russians see UNICEF, op. cit., 73−74.