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[Abstract]

The aim of this paper is to use previous research to identify determinants of mortality rates, an economic variable that affects the size of Russia's population. It is impossible to explain mortality solely in terms of socioeconomic factors, so the survey of medical literature conducted here was essential.

It was concluded that factors such as a deterioration in levels of medical care or an increase in environmental pollution could not easily explain the rise in mortality rates throughout the Soviet era and the fluctuating mortality rates seen after the collapse of the Soviet Union. Previous research has explored the relationship between Russians and alcohol, which had been described anecdotally in literary works, the media, and so on, and demonstrated the significance of alcohol consumption as a factor exerting a decisive influence on long-term changes in mortality rates and the probability of death in Russia since the transition to capitalism.

JEL Classification Codes: J11, J19, P36

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1. Introduction

The economic growth process in emerging nations described by Wilson and Purushothaman (2003) suggests that we are returning to an era in which the size of a country's population is a strong determinant of the scale of its economy (Maddison, 2007). Russia, however, which is regarded as an emerging nation alongside countries such as China and India is experiencing population decline, which sets it apart from other emerging nations, and it is this that makes Russia's population dynamics so interesting.

It is already well known that Japan and Italy are experiencing natural declines in their total populations due to low fertility rates over a long period of time. The situation with Russia's declining population, however, is different. Unlike developed nations, Russia maintained a total fertility rate (TFR) that was adequate to replenish its population until 1989. It is widely known that since 1992 the number of deaths has exceeded the number of births, leading to a natural decline in population[1] (Figure 1). Russia's natural population decline therefore differs from the normal situation in which fertility dynamics play a major role in population change. In the case of Russia, therefore, it may be better to focus on studying the dynamics of mortality.

[Figure 1]

The analysis of factors affecting births in Russia began after the collapse of the Soviet Union, and has been based on the analysis of micro data from the Russia Longitudinal Monitoring Survey (RLMS)[2]. Fertility rates are declining in many developed nations, and it is also widely known that not only Russia, but almost all the former Soviet republics experienced similarly sharp drops in their fertility rates following their transition to capitalism (Kumo, 2010).

However, what is unique about Russia compared with developed nations, the other transitional economies, and so on is that the main long-term real problem it has faced has been its high mortality rates. Its infant mortality rate, which had been declining since World War II,

[1] The last time that Italy's TFR was higher than that required to keep its population stable (population replacement level) was 1976-1977 (2.11/1.98). In the case of Japan, the last time this happened was 1973-1974 (2.14/2.05). In each country, the natural decline in population began at least 15 years and 30 years, respectively, after the TFR fell below the population replacement level.

[2] Detailed information about this survey can be found on the RLMS website: http://www.cpc.unc.edu/rlms/

stopped falling in the 1970s (Davis and Feshbach, 1980; Jones and Grupp, 1983; Anderson and Silver, 1986a). Moreover, mean life expectancy at birth increased much more slowly during the 1960s, and then actually began to decline (Dutton, 1981; Dinkel, 1985; Borisov, 2009). Furthermore, from the end of the 1980s, during the period of turmoil as Russia made its transition to capitalism, the mortality rate among people in the prime of life climbed rapidly, greatly accelerating the natural decline in the population.

On the other hand, when analyzing factors affecting mortality, limitations with the data make it difficult to study the factors directly. Micro data for the Soviet era were not accessible, making it hard to examine the background to long-term trends. Moreover, it is also necessary to take into account the likelihood that factors outside the socioeconomic background have also played a role. For this paper, therefore, the author did not limit himself to studying literature in the social science field, of which there is very little. The author also reviewed numerous studies in the field of medicine, selecting a portion of over 200 research papers to also explore factors that determine the mortality rates in Russia[3].

To begin with, this paper will use descriptive statistics to examine trends in mortality rates by age group, mean life expectancy at birth, and so on in Russia. After that, the author will give an overview of previous research and discuss the key debates. Factors such as levels of medical care and environmental pollution have obviously been dealt with, and their impact is probably undeniable. Statistical distortions and gaps in records have had little impact, so the data can be relied on and regarded as reflecting real conditions. Although various discussions have developed, almost all the previous research strongly suggests that alcohol consumption has been a key reason for the slowing of growth in, subsequent increase in, and current high levels for mortality rates in Russia.

2. Russian Mortality: Descriptive Statistics

The first thing that needs to be pointed out when examining mortality dynamics in Russia is the uniqueness of the long-term trend there. First, the author will look at mean life expectancy at birth, as this is an indicator that is unaffected by a country's age structure. Figure 2 shows data from 1960 to 2009 for mean life expectancy at birth for male in several former communist countries and several Western European countries.

[Figure 2]

It can be seen that from the mid-1960s the communist countries (Bulgaria, Hungary, Poland, and Russia) began to exhibit a clearly different trend from that of the Western European countries. On the whole, mean life expectancy at birth in the Western countries continued

[3] A search of the *Web of Knowledge* (Thomson Reuters) online database produced a total of 192 papers with either <"Russia," "Soviet," or "USSR"> and <"mortality"> in their titles, and more than half of them had been published since 2000.

climbing. In the communist countries, however, hardly any increase was seen between the mid-1960s and 1989–1991, when they were making their transition to capitalism. It can also be seen that mean life expectancy at birth in Russia followed an extremely distinctive path. In Russia, the trend could even be said to have been downward (Dutton, 1979; Rapawy and Baldwin, 1982; Feshbach, 1985; Kingkade, 1987; Blum and Monnier, 1989; Anderson and Silver, 1986b, 1989a, 1989b, 1990; Andreev *et al.*, 2006).

This was recognized as an issue even within the communist bloc at a comparatively early stage. Normally, the factor with the biggest impact on mean life expectancy at birth is the infant mortality rate (the death rate among children less than 12 months old)[4]. However, in the 1970s the infant mortality rate, which had begun increasing, completely disappeared from the *Narodnoe Khozyaystvo SSSR* [Soviet National Economies], an official collection of statistics that the Soviet Union published annually, making it impossible to track the trend from that period onwards.

It can also be seen that mean life expectancy at birth increased temporarily in the mid-1980s. Many researchers have attributed this to the positive effects of anti-alcohol campaign run by the Gorbachev administration at the time (Heleniak, 1995; Bloom and Malaney, 1998; Shkolnikov et al., 2001; Andreev *et al.*, 2006; Stuckler *et al.*, 2009; Carlson and Hoffmann, 2010). In just three years, between 1985 and 1987, mean life expectancy at birth for males rose by over three years, reaching a record high level for the Soviet Union. In 1987, however, the anti-alcohol campaign was cancelled, and from then until the collapse of the Soviet Union mean life expectancy at birth declined once again. It also continued to decline after the collapse, and at an even faster rate than before. Although it climbed briefly from 1995, it dipped again in 1998, the year of the Russian financial crisis. Since the mid-2000s, when proactive population policies began to be implemented, it has risen a little (Figure 2).

The most striking trend seen following the collapse of the Soviet Union is the sharp

[4] A serious, yet well-known problem that needs pointing out is that the Soviet and Russian definition of infant mortality rate differs from that employed by the World Health Organization (WHO). If the United Nations and WHO definition was applied, infant mortality rates in the Soviet Union and Russia would be even higher, further emphasizing the graveness of the problem.

The Soviet Union defined live births as cases in which the baby was born after at least 28 weeks gestation, was at least 35cm long, weighed at least 1,000g, and could breathe unaided, and cases in which the baby was born after 28 weeks of less gestation, was 35cm long or less, was 1,000g or less, but lived for at least seven days. This made the number of live births lower than they would have been under the WHO definition (which states that regardless of the period of gestation or the life period of the infant, a birth is considered live if the baby shows signs of life after birth, such as breathing, a heartbeat, or muscular movement, see United Nations, 2001), which in turn made the statistics such as the infant mortality rate lower than in other countries. In other words, if the WHO definition had been applied to the Soviet Union's infant mortality rates, they would definitely have been higher than Soviet government statistics suggested. See Davis and Feshbach (1980) and Goskomstat Rossii (2000), pp.51–54. Although the Russian Federation declared that they adopted the WHO definition on January 1, 1993, Russian Federation Ministry of Health Ordinance No.490 (December 4, 1992) instructed birth registry organizations to define live births using the same weight criteria as in the Soviet era (in principle, live births would be cases in which the baby weighed at least 1,000 g (or less than 1,000 g in the case of multiple births), the same weight limit employed by the Soviet Union, or less than 1,000 g if the infant survived for seven days or longer), which was obviously at odds with the WHO definition.

rise in mortality rates in men 30 years or over. Such a phenomenon has not been seen in developed countries in recent years, so it has to be said to be unique to Russia and the former Soviet Union (Shkolnikov *et al.*, 1998; Brainerd, 1998; Anderson, 2002; Khalturina and Korotaev, 2006; Osipov and Ryazantsev, 2009). Table 1 shows changes over time in mortality rates for Russian men in different age groups. Figures for Japan in 2000 are also provided for reference. A key point is that mortality rates for Russian men between the ages of 30 and 59, i.e. men in the prime of their lives, have almost doubled. Obviously, rates are far higher than those in Japan for every year and every age group. However, given the fact that the infant mortality rate has dropped steadily despite showing signs of rising at one point, the rise in mortality rates among people in the prime of their lives from the collapse of the Soviet Union until the mid-2000s is striking (Da Vanzo and Grammich, 2001; Vishnevskiy, 2009).

[Table 1]

With rising mortality rates, mean life expectancy at birth for males has fallen since the collapse of the Soviet Union. As Figure 2 shows, in 1990 the mean lifespan of men was around 65 years. In 1993, however, it dropped below 60 years, and has remained at a low level since then. It is worth pointing out that the last time the mean lifespan of men in Japan was below 60 years was in 1950‐1951 (Ministry of Health, Labor and Welfare of Japan, 2007).

What also needs to be emphasized, however, is the trend with the infant mortality rate. At the beginning of the 1970s, when infant mortality rates disappeared from the Soviet Union's official statistics, the infant mortality rate increased (Figure 3). After that, however, despite short-lived rises in 1993‐1994 and 1998, the overall trend seems to have been downward (Webster, 2003; UN Russia, 2008). The trends in mean life expectancy at birth and the infant mortality rate do not match each other. In other words, it can probably be concluded that the decline in mean life expectancy at birth following the collapse of the Soviet Union was not due to an increase in the infant mortality rate. It could even be said that this provides strong supporting evidence for refuting the commonly accepted hypothesis that the deterioration in levels of medical care following the collapse of the Soviet Union caused mortality rates in Russia to rise (Kontorovich, 2001; Khalturina and Korotaev, 2006).

[Figure 3]

3. Perspectives from Previous Research

As mentioned at the beginning of this paper, it was difficult to study the factors that affected mortality in Russia during the Soviet era. Not only was micro data unobtainable, data on causes of death and mortality rates was extremely limited. However, this situation changed after the collapse of the Soviet Union, when vast amounts of information became available. National and regional statistics such as numbers of deaths began to be published regularly, and it

became possible to examine micro data. Furthermore, it is no longer impossible to access mortality statistics from the Soviet era.

With these changes taking place, the number of papers being published increased suddenly from around 2000, and a huge body of knowledge has already been accumulated. Of course, one reason for this is probably that the range of publishing media has also increased in recent years. A search for research on causes of death in Japan, whether it relates to Russia or not, reveals that the number of papers increased sharply from the 1990s[5] also, making it difficult to deny the impact of the expansion in the range of publishing media.

At the same time, however, micro data began to be accumulated in Russia after the collapse of the Soviet Union, and it also became far more accessible, and this probably also made a huge contribution. During the Soviet era (i.e. until 1991), no micro-data-based analysis of causes of death seems to have been conducted. Since the collapse, however, researchers at medical institutions have been conducting analyses using data determining causes of death through autopsy. A lot of this research has appeared in journals with fairly long histories, such as *Addiction* (2011, No. 106), *Alcohol and Alcoholism* (2011, No. 46), *Social Science and Medicine* (2011, No. 73), *Public Health* (2011, No. 125), and *Lancet* (published since 1823), suggesting that the increase in such research can probably not be attributed solely to the expansion in the range of publishing media.

The debate on factors affecting mortality in Russia has generally focused on factors that are intuitively easy to understand, such as low levels of medical care, environmental pollution, and alcohol consumption. Furthermore, not just during the Soviet era but also since the emergence of the new Russia, the credibility of a lot of statistics has been doubtful. Nevertheless, among the various factors that could be considered to have played a role, it is the impact of the volume, frequency and the way of alcohol consumption on the mortality rate among men in the prime of their lives that is being studied most extensively, as it is consistent with an observed phenomenon[6].

3.1 Levels of Medical Care

In the Soviet Union medical services were provided for free, and in terms of quantitative indicators such as the number of doctors, nurses, and hospital beds, the level of medical care was superior to that of developed nations. This much is widely known, and can also be seen in official statistics from the Soviet era (Levin, 1979; Kotryarskaya, 1990; Cromley and Craumer, 1990, 1992). From the Soviet era to the present day, the number of doctors and nurses has been high compared with developed nations. In 1985, during the Soviet era, there

[5] The search was conducted using the *Web of Knowledge* online database.

[6] Micro data reveals that mean alcohol consumption among women is about 1/5 (estimate based on forms from the RLMS) that of men, and its impact on mean life expectancy at birth for females also differs greatly from that for men.

were 3.9 doctors for every 1,000 people[7]. In the same year in the U.S., there were 1.7, while in Japan the figure was 1.5. Even in 2000, Russia had 4.2 doctors for every 1,000 people, a figure that was only surpassed by Greece (with 4.3) among the OECD nations[8].

It goes without saying, however, that the key issue with medical care is quality rather than quantity. Balabanova *et al.* (2004) conducted an analysis using micro data from 2,000–4,000 people, and they found that Russia, even after the collapse of the Soviet Union, performed well in terms of accessibility to medical institutions. However, in terms of the key issue, the quality of medical care, McKee (2006), who used anecdotal evidence to discuss problems with medical care in the Soviet Union, and Gil *et al.* (2010), who conducted interviews concerning the handling of alcohol issues by the government and medical institutions, and Tkatchenko *et al.* (2000), who stated the need for legal-system reform after conducting interviews with people from government medical care organizations concerning the problems facing them, pointed out policy problems with medical care in Russia. These included the lack of a route for relaying problems recognized by frontline organizations to organizations higher up the chain of control. In addition, the views of Dubikaytis *et al.* (2010), who highlighted disparities among individuals in St. Petersburg, Russia's second largest city, in terms of the medical services they were able to receive should not be ignored.

If levels of medical care were low for a long period of time, could it be that this contributed to the long-term decline in mean life expectancy at birth in Russia (and the Soviet Union)? If the situation just remained the same, it would be difficult to argue that it explained the *decline* in mean life expectancy during the Soviet era. However, if the level of medical care *deteriorated*, that could be expected to have caused a *decline* in mean life expectancy.

However, given that the Soviet Union achieved sustained economic growth until the 1980s, it is difficult to argue that the level of medical care declined. It is known that in 1961, when faced with an epidemic of polio, Japan imported enough live oral polio vaccines for 10 million people from the Soviet Union, and succeeded in getting the outbreak under control (Ministry of Health and Welfare of Japan, 1962). This suggests that even in the Soviet Union, which was noted for the gap between its advanced technology and its technology for the masses, a certain level of medical care was accessible to ordinary people. In the first half of the 1970s, the infant mortality rate increased (Figure 3), and although more research needs to be conducted on the causes, it returned to a sustained downward trend thereafter. The conclusion therefore must be that if medical care in the Soviet Union and Russia had been deteriorating continuously, the infant mortality rate could not have trended downward[9].

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[7] In 1985 the only countries with more than 3.3 doctors per 1,000 people were Soviet republics and Mongolia.

[8] The figures were 2.2 people in the U.S. and 1.9 people in Japan. See World Bank, *World Development Indicators*.

[9] However, Ivaschenko (2005), using data such as mortality rates in different regions of Russia following the collapse of the Soviet Union found that healthcare investment had a significant, positive impact on lifespans, so needless to say, medical care can still be improved.

3.2 Environmental Pollution

Needless to say, focusing heavily on economic growth frequently results in the destruction of natural environments, and this was identified as occurring in Russia at an early stage. A famous work by Goldman (1972) highlighted inadequacies in government environmental regulation in the Soviet Union. Laws and regulations existed, and the national government was responsible for their implementation, yet the same national government also owned and controlled the companies that produced the pollutants in the course of their production activities. These companies had to meet production targets and were punished if they failed to meet them. Under such circumstances, it is reasonable to assume that local governments would tend to focus more on production issues than the environment.

Since the collapse of the Soviet Union, research has been conducted, for example, on differences in lifespans among regions using figures such as the amount of pollutants in the air or water as explanatory variables. For example, Larson *et al.* (1999) found that mortality rates in areas around pollutant-emitting companies in Volgograd, a city of one million people in southern European Russia, , were significantly higher than in other areas. However, it is probably unusual for individuals to reside next to a polluter. Kozlov (2004), for example, compared two cities in northwestern Russia with extremely high levels of harmful substances in the air with two cities with extremely low levels of air pollution. However, he reported that he was unable to find a clear relationship between mortality rates and the quantity of pollutants such as sulfur dioxide for the cities as a whole.

If environmental pollution had been deteriorating continuously, it would possibly have resulted in a long-term decline in mean life expectancy at birth. Moreover, it would be reasonable to assume that as the economy of the Soviet Union grew, emissions of waste and pollutants increased. That may explain the downward trend in mean life expectancy at birth from the 1960s to the 1980s.

Nevertheless, it needs to be pointed out that the trend in industrial output after the collapse of the Soviet Union makes it difficult to explain mortality rates in terms of environmental factors. Following the collapse of the Soviet Union, Russian industrial output decreased sharply. At the same time, pollutant emissions per capita have fallen steadily for over 20 years since peaking at the end of the Soviet era[10] (Cherp *et al.*, 2003). Environmental pollution cannot therefore explain the rise in mortality rates among people in the prime of their lives during the 20 years since the collapse of the Soviet Union. During the period of rapid economic growth after the World War II, for example, Japan showed increases in pollutant emission (Center for Global & Regional Environmental Research, *STEM II*, University of Iowa) and faced with diseases caused by environmental pollution, but it needs no mention that in Japan mean life expectancy at birth increased almost continuously and the infant mortality rate declined fairly steadily during the same period (Figures 2 and 3). Although there were several

[10] Also see Rosstat, *Rossiiskii statisticheskii ezhegodnik*, various years（in Russian）.

other factors that could have offset the effects of a worsening environment, the data can at least be said to show that localized environmental deterioration could not have been a decisive factor behind the decline in mean life expectancy at birth or the rise in mortality rates at the macro/national level.

3.3 Statistical Inaccuracies

One issue with statistics from the Soviet Union that has been widely pointed out is their lack of credibility. Treml and Hardt (1972) addressed this issue many years ago, and Chinn (1977), Clem (1986), Anderson and Silver (1985a; 1985b; 1986a), Jones and Grupp (1983; 1984) also need to be mentioned because they examined the quality of population statistics.

Jones and Grupp (1983) cast doubt on the credibility of Soviet fertility and mortality statistics relating to a period of over a decade after World War II. They found that with the Soviet Union's infant mortality rate in a clear downward trend between 1958 and 1968, infant mortality rates in central Asian Islamic SSRs such as Kyrgystan were exhibiting the completely opposite trend. In other words, at the beginning of the period their figures were lower than for the Russian SSR, while at the end of the period they were higher than for the Soviet Union as a whole and the Russian SSR. They argued that there were therefore problems with the collection and recording of statistics for central Asia[11].

This argument is extremely clear-cut and persuasive. However, it needs to be kept in mind that this seems to show that the Soviet statistical authorities may not actually have been attempting to deliberately distort statistics. In fact, Kumo (2004), which examined internal documents from the Soviet cabinet, compared officially published Soviet statistics with confidential data from the Soviet cabinet, yet found no disparities. This shows, for example, that official statistics were the simple result of compiling internal figures relating to regional economic growth processes, which were completely at odds with the Soviet Union's policy goal of evening out levels of economic development among regions. Using internal data relating to population census results from the Soviet central statistical bureau, Andreev, Darskii, and

[11] ZAGS is an organization that registers matters such as births, deaths, marriages, and divorces. It retains the same name in modern Russia that it had during the Soviet era, and is under the supervision of the Ministry of Justice. See <Kodeks o brake i seme RSFSR ot iunia 1969 goda>. The decision to establish ZAGS was made between 1917 and 1918, with the organisation intended to replace the parish registers that had been used until then. Apparently, however, because of factors such as the turmoil of the civil war, it was not until the end of 1919 that the cities of European Russia introduced the new system, and even in 1923 the system still only covered urban areas, albeit throughout the entire nation (TsSU SSSR, 1928a). By 1926 the system seems to have been functioning throughout the whole of the Russian Soviet Socialist Republic, given that the number of infants under one year old recorded in the 1926 census nearly matched the number of births minus infant mortalities derived from the ZAGS records. However, it is posited that the ZAGS system remained inadequate in Central Asia and the Caucasus (TsSU SSSR, 1928b, TsSU RSFSR, 1928). For the period after the World War II there is a note that around 100 ZAGS branches were not functioning properly in official documents even in the current Russian territory (See, for example, RGAE, F.1562, O.20, D.841, L.2). It is very natural to assume that the situation must have been worse in Central Asia than in European parts of Russia.

Kharikova (1998) identified clear inconsistencies in figures for the population of males in each age group in different regions. They pointed out, however, that this might not have been the result of an attempt to idealize population distribution in the Soviet Union. Rather, it may just have been due to unintentional errors made during the statistical compilation process.

Chinn (1977), Anderson and Silver (1985a, 1985b, 1986a), Leon and Chenet (1997), and more recently Tolts (2008) and Gavrilova *et al.* (2008), while casting doubts over the quality of data[12], did not reject it as unusable. One problem was that causes of death were being inappropriately classified based on specific patterns[13], but fertility and mortality statistics for the 1960s, 1970s, and thereafter were probably adequate for gauging overall trends, though the same could perhaps not be said for the period of turmoil immediately following World War II.

Regarding matters such as the identification of causes of death, another perspective also needs to be taken into account. It has been pointed out, for example, deaths stemming from long-term alcohol addiction are often classified as "acute alcohol poisoning" (Blum and Monnier, 1989; Pridemore, 2004), while deaths caused by external factors such as homicide and accidents were sometimes classified otherwise due to ethical problems in the police force (Kim and Pridemore, 2005). These issues are, however, insufficient for rejecting the usability of the data, and they could perhaps be said to present some problems.

3.4 Alcohol

Research on the subject of Russians and alcohol consumption has a very long history[14] (Blum and Monnier, 1989; Stickley *et al.*, 2009), but recently a huge number of medical papers have been published. As was pointed out earlier, key reasons for this have probably been the fact that micro-level analysis became possible after the collapse of the Soviet Union and the fact that statistics going back to the Soviet era have come to be compiled and made public.

Treml (1982) wrote a well-known book highlighting the problem of alcohol consumption in the Soviet Union. The fact that it was inappropriate to investigate Russians' alcohol consumption using data from official statistics in the quantity of alcohol produced and sold made it difficult to debate the relationship between alcohol consumption and the deaths of Russians. This was because it was often pointed out that Russians frequently consumed illegally-produced alcohol or alcohol produced for purposes other than drinking (cologne, antifreeze, etc.)[15] (Leon, Shkolnikov and McKee, 2009; Perlman, 2010).

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[12] See Footnote 4. Issues relating to infant mortality have still not been resolved.

[13] For example, Gavrilova *et al.* (2008) studied autopsy results between 1991 and 2005 for two cities in European Russia, Kirov, and Smolensk, and found that at least 89% of inaccurate classifications were the result of decomposition of the corpse.

[14] Stickley *et al.* (2009) compared deaths due to alcohol poisoning in Russia (the Soviet Union) in the 1860s and 1920s. The phenomenon has also been described frequently in recent years, for example in *The Times* (January 5, 2010), *New York Times* (April 16, 2011), and *Moskovskie novosti* (October 07, 2011) (in Russian).

[15] Other factors that make this problem even more serious are the fact that the percentage of alcohol by volume in liquids such as cologne is far higher than that of alcoholic beverages (with a percentage of

Treml (1982) made estimates of alcohol consumption in Russia by assuming, for example, that the maximum amount of sugar that could be consumed per person was the amount consumed by North Americans, and that the difference between that figure and the amount of sugar produced and imported in the Soviet Union at the time represented the amount of sugar used for illicit alcohol (i.e. moonshine) production. According to these estimates, total consumption of government-produced and illegally-produced alcoholic beverages, i.e. total alcohol consumption, increased more or less continuously from 1955 until 1979, with per-capita consumption of alcohol among citizens 15 years or older estimated at 14.58 liters in 1978 (Treml, 1982, p.68). If this figure is correct, Russians consumed a lot more than the amount of pure alcohol consumed by Japanese citizens of 15 years or older in 2003‐2005 (8.03 liters, WHO, 2011).

If Treml's (1982) estimate that alcohol consumption continued to increase during the latter part of the Soviet era was accurate, it may have caused the decline in the mean lifespans of Russians seen from the 1960s. The level of alcohol consumption was extremely high relative to other countries, and a great deal of the alcohol consumed was in the form of liquor. Research arguing that this, and the sustained increase in consumption, could explain the rise in mortality rates during the Soviet era has existed since this era (Blum and Monnier, 1989), but conducting a detailed investigation required the collapse of the Soviet Union and an increase in the accessibility of data.

Following the collapse of the Soviet Union, remarkable progress was made in research. In particular, researchers working the medical field in the former Soviet Union, such as Nemtsov (2002, 2003) and Razvodovsky (2009a, 2009b) conducted analyses based on macro data from the Soviet era that they had uncovered, while research was also performed by quantitative sociology researchers such as Pridemore (2002, 2004, 2005, 2006). Moreover, the results of micro-level analyses based on autopsy data conducted jointly with researchers from Russian medical institutions[16] have been published in rapid succession.

Although problems with making judgments about cause-and-effect relationships based on time-series data for just two variables are well known, per-capita alcohol consumption and mortality rates (mean life expectancy at birth) in Russia have somehow exhibited the same trend, and there is more than just a correlation between the increase in per-capita alcohol consumption during the Soviet era and mortality rates. When the anti-alcohol campaign was being conducted, alcohol consumption declined and lifespans lengthened, while at the time of the transition to capitalism alcohol consumption increased and lifespans decreased sharply, and all this is

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alcohol by volume of 90%, it is much purer than alcoholic beverages, which makes it far more dangerous to consume) and the fact that the price per unit of pure ethanol with such liquids is lower than with alcoholic beverages.

Note that according to returned-form data from the RLMS, at least 15% of men of working age consumed illegally-producted liquor (*samagon*) in 2004.

[16] A lot of this research links alcohol consumption to deaths due to external factors, such as homicide and suicide. The reason such data can be used is that an autopsy is always performed in cases such as homicide, meaning that blood alcohol levels can be obtained.

consistent with the understanding that alcohol consumption has caused higher mortality. Moreover, there is no variance between studies conducted using macro data and analysis of personal alcohol consumption and mortality rates based on micro data following the collapse of the Soviet Union. On the contrary, an extremely consistent relationship can be identified. In other words, alcohol consumption may be able to explain mortality dynamics for both the end of the Soviet era and the initial period of the transition to capitalism, and this is a debate that needs to be pursued further.

4. Alcohol Consumption and Mortality Rates in Russia

As the sections above have seen, there seems to be a strong relationship between alcohol and mortality rates, and in this section the author will explore this further by examining researches conducted since the second half of the 1990s to find out whether this discussion stands up to scrutiny.

4.1 Estimates of Alcohol Consumption from Previous Research

Table 2 and Figure 4 give statistics for alcohol consumption. All estimates from previous research are for pure alcohol volume, extrapolated from the percentage of alcohol assumed to be contained in each type of alcoholic beverage. Treml (1997) and Nemtsov's (2002) estimates for illicitly-produced liquor, meanwhile, are based on the method employed by Treml (1982). As a result, estimates for years included by both Treml (1997) and Nemtsov (2002) are more or less the same.

[Table 2]

[Figure 4]

Trends seen in official statistics match those from previous research that includes estimates of illicitly-produced alcohol consumption. In other words, from 1960 to around 1980, per-capital consumption of pure alcohol increased, before falling sharply in the mid-1980s. However, at the end of the 1980s, just before the transition to capitalism began, consumption began rising again. Both official statistics and estimates that include illicitly-produced alcohol consumption show that this trend continued until the beginning of the 1990s. In the mid-1990s consumption briefly showed signs of falling, but at the end of the 1990s it climbed once again. However, there are big quantitative differences between the estimates based on official statistics and those that include consumption of illicitly-produced alcohol, and it ought to be borne in mind that these differences expanded following the collapse of the Soviet Union[17].

[17] During the Soviet era, the government had a monopoly on the sale of vodka, and this was lifted in

However, if one turns once again to the trend in mean life expectancy at birth of Russian men (Figure 2), one will find that it declined continuously from the mid-1960s until around 1980. Although it increased significantly in the mid-1980s, when the anti-alcohol campaign was implemented, it had already started falling again by the late 1980s, and in 1993, following the transition to capitalism that began in 1991, it dropped to its lowest level, 57.6 years, since the Soviet era. Although it quickly began rebounding, between 1998, when the financial crisis occurred, and 1999 it declined by 2.3 years. As this shows, trends in the volume of alcohol consumption and mean life expectancy at birth, which serves as a general indicator of the mortality rate, match each other.

A problem with this graph is that it does not enable a comparison to be made of the findings of Treml (1982) on the one hand and Treml (1997) and Nemtsov (2002) on the other. Treml (1987) employed per-capita figures for citizens 15 years or older, while Treml (1997) and Nemtsov (2002) calculated the volume of alcohol consumption for each citizen. Therefore, to compare these figures with those of Treml (1982), the figures for the 1980s onwards need to be revised upwards. It is only because of the disability to capture true figures that the figures for the early 1990s are lower than those for the 1970s in the official statistics. On the other hand, the reason why the estimates for the end of the 1970s and the 1990s do not appear to be all that different is the different definitions used by Treml (1982) and Nemtsov (2002). For people aged 15–59, the figures for the first half of the 1990s are higher than for 1970 and 1975, and are quantitatively much higher, as over 18 litres per citizen 15 years or older (Treml, 1982; Nemtsov, 2002). There is therefore probably no inconsistency between the decline in mean life expectancy at birth during the early phase of the transition to capitalism and the trend in alcohol consumption.

One point to be mentioned is the following. Although it is true that the quantity of alcohol consumption in Russia is comparatively large, Russia is not the only country which shows a large amount of per capita alcohol consumption in the world. Average annual consumption of alcohol per adult in the United Kingdom and that in France also exceed 15 liters (WHO, 2011). What differs among them is, however, drinking patterns and the variety of alcohol beverage consumed. Beer is most favorite among UK adults, and so is wine in France. On the contrary, more than fifty per cent of pure alcohol is taken in the form of liquors (vodka) in Russia. When one discusses about drinking patterns, a clear contrast emerges that UK or French people drink alcohol beverage of certain, not extreme, amount almost daily, while Russian people show binge drinking patterns in the weekend (WHO, 2011; Pridemore, 2004). In both aspects, patterns of alcohol drinking of Russian people involve severer problems than those of others.

1992. See <The Decree on the Abolition of the State Monopoly on Vodka in the Russian Federation>, June 7 1992. At the very least, it is well known that official statistics failed to adequately reflect actual alcohol consumption.

4.2 Cause-and-Effect Relationship Between Alcohol and Mortality Rates

It is fair to say that quantitative, cause-and-effect analysis only really began to be conducted at the end of the 1990s and during the 2000s. Nevertheless, it has already produced numerous findings. Table 3 describes over 20 papers published since 2000 that examined the direct relationship between alcohol consumption and mortality. Papers that did not employ descriptive statistics all found that alcohol consumption significantly increased mortality rates[18]. Moreover, even when descriptive statistics were used, it is easy to show that significant results can be obtained when testing ratios in the case of case-control studies (author's own calculation). Looking at these findings in conjunction with the macro data trends described in the previous subsection, it can be said that in Russia alcohol consumption and mortality rates are closely related.

[Table 3]

Of course, it cannot be concluded that other factors do not need to be considered. Twigg (2008) pointed out how smoking became widespread after the breakup of the Soviet Union, and researchers such as Perlman (2008) and Denisova (2010) showed that smoking significantly raised the probability of death. Meanwhile, Leon *et al.* (2007) found that deceased people with inappropriate histories of alcohol consumption[19] had very low educational backgrounds. Similarly, Malyutina *et al.* (2004) studied social surveys conducted between the mid-1980s and the mid-1990s, and found that the higher a person's level of education, the less alcohol they consumed. Andreev *et al.* (2009) unearthed mortality statistics from 1970–1989, which showed that manual laborers had relatively higher mortality rates. Pridomore *et al.* (2010), who pointed out that a higher proportion of people whose death was caused by alcohol had lost their spouses or partners through death or estrangement than people who had died of other causes, suggested that mortality probability may be related not only to psychological factors but also diet and other aspects of lifestyle. If lifestyles are to be considered, it will be necessary to take into account a wide range of factors, such as a high-fat diet, the increase in obesity that stems from such a diet, and Russia's cold climate. Huffman and Rivoz (2010), using data from the RLMS, demonstrated a significant relationship between fat consumption and obesity among Russians[20]. Revich and Shaposhnikov (2008) used macro data from different regions to investigate the impact of air temperatures on lifespan, and they found that low temperatures significantly reduce mean lifespan.

[18] Although some use the rate of death due to alcohol poisoning as the explanatory variable, this is used as a proxy variable for binge drinking.
[19] Deceased persons who frequently engaged in binge drinking or drank alternative forms of alcohol, i.e. alcohol that is not meant for drinking.
[20] However, mean BMI (Body-Mass Index) among Russians did not increase between 1995 and 2004.

However, it cannot have been the case, for example, that the Soviet Union was getting continuously colder, or that air temperatures dropped during the transitional period[21]. During the Soviet era, levels of education, seen in terms of figures such as the percentage of people graduating from university, increased continuously. Moreover, the proportion of workers engaged in manual labor is also believed to have been on a downward trend. From the 1960s to the 1980s, when the economy was growing continuously, it is hard to imagine that the nutrition of people living in the Soviet Union deteriorated. It is difficult to conclude that such factors can explain (1) the downward trend in mean life expectancy at birth from the 1960s to the 1980s, (2) its increase in the late 1980s, and (3) its sharp fall in the early 1990s following the collapse of the Soviet Union throughly. Obviously, a single factor, alcohol consumption, cannot explain the entire dynamics of mortality in Russia, and the above mentioned factors have probably also played a role. It seems to be, however, difficult to deny that alcohol consumption is a more persuasive factor for explaining the trends in mean life expectancy at birth in Russia than these other factors.

4.3 Clues from Statistics on the Causes of Death

To assess whether the above interpretation is reasonable, let the author confirm one more thing from descriptive statistics. Among the causes of death, those that are closely connected to alcohol consumption are “diseases of the circulatory system” and “external causes” (Pridemore, 2002; Nemtsov, 2002; Brainerd and Cutler, 2005; Zaridze *et al.*, 2009a). Figure 5 shows the long-term trends in the proportion of deaths caused by various factors in Russia (the current territory of Russia). It is clear that between 1965 and 1990 the proportion of deaths attributable to diseases of the circulatory system increased continuously, and that between 1965 and 1980 the proportion of deaths due to external factors was high. This is consistent with the possibility that high mortality rates and low mean life expectancy at birth in the Soviet Union and were related to alcohol consumption.

[Figure 5]

It is also clear that following the collapse of the Soviet Union at the end of 1991, the proportion of deaths resulting from external factors, which had declined between 1985 and 1990, shot up, and remained at a high level until the beginning of the 2000s, and that from 1995 onwards the proportion of deaths due to diseases of the circulatory system increased sharply and thereafter stayed at a high level.

[21] As Hill and Gaddy (2003) have pointed out, during the Soviet era the population was heavily concentrated in the north, though it is difficult to conclude that this factor could have been powerful enough to reduce mean life expectancy at birth. Moreover, between 1960 and 1970 and then again following the collapse of the Soviet Union, their “temperature per capita” indicator increased a little, which is inconsistent with trends in mean life expectancy at birth.

If, during the transition to capitalism, levels of medical care and hygiene had deteriorated, the number of deaths due to contagious and infectious diseases would have increased. Moreover, such diseases would have affected mortality rates among those with weak immune systems, i.e. babies and infants, rather than adults. However, the proportion of deaths due to infectious diseases did not exhibit any marked increase, and the infant mortality rate was not seen to rise sharply or remain at a high level[22]. As a result, the view that the increase in psychological stress accompanying the transition to capitalism, the resultant rise in alcohol consumption, and the subsequent increase in deaths due to diseases of the circulatory system and external factors contributed to the rise in mortality rates is consistent with the facts.

5. Conclusion

Through a survey of the literature and explanations of descriptive statistics, this paper has focused on the dynamics of mortality rates, which is one of the population issues facing Russia. It was concluded that factors such as deterioration in levels of medical care or an increase in environmental pollution could not easily explain the rise in mortality rates throughout the Soviet era and the fluctuating mortality rates seen after the collapse of the Soviet Union. Previous research has explored the relationship between Russians and alcohol, which had been described anecdotally in literary works, the media, and so on, and demonstrated the significance of alcohol consumption as a factor exerting a decisive influence on long-term changes in mortality rates and the probability of death in Russia since the transition to capitalism[23].

The aim of this paper was to use previous research to identify determinants of mortality rates, an economic variable that affects the size of Russia's population. It is impossible to explain mortality solely in terms of socioeconomic factors, so the survey of medical literature conducted here was essential. Nevertheless, when thinking about the background to the problem, i.e. why Russians consume so much alcohol in an inappropriate way, it is not enough to consider, for example, only cultural or ethnic aspects. Rather, it is more natural to assume that the turmoil of Russia's transition to capitalism had an impact on the socioeconomic situation. This is the

[22] For example, in Russia in the decade following the collapse of the Soviet Union, during which more than two million people died each year, the number of people to die from infectious diseases was only 36,214 in 2000, the year for which this figure was the highest. In that year the total number of deaths was 2.22 million. See Goskomstat Rossii, 2001. In the ten years from 1991, the annual fluctuation in the number of deaths was over 300,000 people, and figures of less than 40,000 deaths annually from infectious diseases even during peak years mean that such deaths cannot have been behind rising mortality rates in Russia during the 1990s.

[23] It should be added, however, that it is not the case that alcohol consumption has only negative effects. Using data from the RLMS, Tekin (2004) found that people who consumed a moderate amount of alcohol (once per week) were significantly more likely to be in employment and more likely to earn higher wages than those who consumed no alcohol at all. This may be because alcohol increases opportunities for human interaction. Moreover, Perlman *et al.* (2008) also found that people who consumed a moderate amount of alcohol (once per week) were significantly more likely to be in employment had lower mortality rates than those who consumed no alcohol at all.

next issue to be explored and the relationship between (1) socio-economic environment of individuals and their alcohol consumption and (2) alcohol consumption and mortality should be examined by using micro-data.

The Russian federal government is looking for ways to tackle this situation. In 2005, when Vladimir Putin was president, a series of projects, called "Priority National Projects,"[24] were launched. One of them was a health-focused project, aimed at improving levels of medical care, and it led to a massive increase in federal government spending on medical care. The project focused on improving advanced medical care by enhancing frontline standards of treatment and investing in medical equipment. Later, the list of issues it was charged with addressing was expanded to encompass better treatment in the case of accidents and diseases of the circulatory system, medical system reform, the advocating of lifestyle improvements, a focus on preventative medicine, and so on[25].

In the second half of the 2000s tougher and more direct restrictions were placed on alcohol. In 2006 the law was changed to require degenerative ingredients to be added to alcohol that was not for drinking purposes[26], which demonstrates that there was a will to put a stop to the consumption of alternative forms of alcohol. Later, in January 2010, a minimum price was set for vodka[27], with the aim of curbing alcohol consumption. Although more time will be needed to assess whether these policies have been effective, Figure 7 shows that the proportion of deaths resulting from external factors has been falling continuously since 2005. Moreover, the "advocating of lifestyle improvements," one of the measures included in the project, is clearly important given the behavior of Russians with respect to alcohol that one has seen in this paper. The direction the Russian government is moving in is therefore probably the right one.

A key issue with this paper is that almost all the literature examined is in English. The papers reviewed have not only been from the fields of economics and sociology. The main reasons for this are that a huge number of the ones dealing with alcohol and the mortality rates of Russians were published in medical journals and that Russian-language medical papers have not been compiled and accessibility to them is limited. The Russian-language papers dealt with in this paper have mainly been from the fields of demographics or sociology, and most of them were published in books rather than academic journals. However, medical researchers such as Nemstov and Razvodovsky, who are the main debaters concerning analysis of causes of death in the Soviet Union (in Russia, the Belarus etc.) and have written numerous papers, and Andreev and Vishnevskii[28], who are the leading researchers on demographics in Russia, have presented

[24] Details can be found on the website of the Council for Implementation of the Priority National Projects attached to the President of the Russian Federation (<http://www.rost.ru>, accessed on January 5, 2012).

[25] This information is also contained in the descriptions of individual projects found on the website of the Council for Implementation of the Priority National Projects attached to the President of the Russian Federation.

[26] Revised version of N171-F3, a federal law governing the production and sale of ethanol, liquor, alcohol, and foods containing liquor, as well as the consumption of alcoholic beverages.

[27] *RIA Novosti*, January 13, 2010. (in Russian). In this article, Prime Minister Putin stated an objective of halving per-capita alcohol consumption by 2020.

[28] Professor Nemtsov works at the Russian Federation Ministry of Health and Social Affairs' Moscow

their findings both within Russia and overseas and published a lot of English-language papers in journals. This implies that the problems with the scope of the literature available are diminishing somewhat. Nevertheless, there is no doubt that further exploration of the Russian-language literature with analytical approaches remains a challenge.

Research Institute of Psychiatry, while Professor Razvodovsky is a researcher at the Hrodna State Medical University in Belarus. Professor Andreev works at the Max Planck Institute (in Germany), while Professor Vishnevslii, who spent many years at the Russian Academy of Science's Central Economic Mathematical Institute, moved in the second half of the 2000s to the Higher School of Economics.

References

Anderson, B. (2002), Russia Faces Depopulation? Dynamics of Population Decline, *Population and Environment*, vol.23, no.5, pp.437-464.

Anderson, B. and B. Silver (1985a), 'Permanent' and 'Present' Populations in Soviet Statistics, *Soviet Studies*, vol.37, no.3, pp.386-402

Anderson, B. and B. Silver (1985b), Estimating Census Undercount from School Enrollment Data: An Application to the Soviet Census of 1959 and 1970, *Demography*, vol.22, no.2 pp.289-308.

Anderson, B. and B. Silver (1986a), Infant Mortality in the Soviet Union: Regional Differences and Measurement Issues, *Population and Development Review*, vol.12, no.4, pp.705-38.

Anderson, B. and B. Silver (1986b), Sex Differentials in Mortality in the Soviet Union: Regional Differences in Length of Working Life in Comparative Perspective, *Population Studies*, vol.40, no.2, pp.191-214.

Anderson, B. and B. Silver (1989a), Patterns of Cohort Mortality in the Soviet Population, *Population and Development Review*, vol.15, no.3, pp.471-501.

Anderson, B. and B. Silver (1989b), The Changing Shape of Soviet Mortality, 1958-1985: An Evaluation of Old and New Evidence, *Population Studies*, vol.43, no.2, pp.243-265.

Anderson, B. and B. Silver (1990), Trends in Mortality of the Soviet Population, *Soviet Economy*, vol.6, no.3, pp.191-251.

Andreev, E.M., L.E. Darskii and T.L. Kharkova (1998), *Demograficheskaia istoriia Rossii: 1927-1959*, Informatika, Moskva. (in Russian)

Andreev, E., D. Bogoyavlenskii, A. Bishnevskiy, E. Kvasha and T. Khar'kova (2006), Moderniaztsiya smertnosti, in A. Vishnevskiy eds., *Demograficheskaya modernizatsiya Rossii 1900-2000*, Novoe izdatel'stvo, Moscow. (in Russian)

Andreev, E., Hoffmann, R., Carlson, E., Shkolnikov, V. and T. Kharkova (2009), Concentration of Working-Age Male Mortality among Manual Workers in Urban Latvia and Russia, 1970-1989, *European Societies*, vol.11, no.1, pp.161-185.

Balabanova, D., M. McKee, J. Pomerleau, R. Rose, and C. Haerpfer (2004), Health Service Utilization in the Former Soviet Union: Evidence from Eight Countries, *Health Service Research*, vol.39, no.6, pp.1927-1950.

Bloom, D. and P. Malaney (1998), Macroeconomic Consequences of the Russian Mortality Crisis, *World Development*, vol.26, no.11, pp.2073-2085.

Blum, A. and A. Monnier (1989), Recent Mortality Trends in the U.S.S.R.: New Evidence, *Population Studies*, vol.43, no.2, pp.211-241.

Borisov, V. (2009), Demograficheskaya situatsiya v sovremennoi Rossii, in Antonov, A. eds., *Demograficheskie issledovanya*, MGU, Moscow. (in Russian)

Brainerd, E. (1998), Market Reform and Mortality in Transition Economies, *World Development*, vol.26, no.11, pp.2013-2027.

Brainerd, E. and D. Cutler (2005), Autopsy on an Empire: Understanding Mortality in Russia and the Former Soviet Union, *Journal of Economic Perspective*, vol.19. no.1, pp.107-130.

Carlson, E. and R. Hoffmann (2010), The State Socialist Mortality Syndrome, *Population Research and Policy Review*, vol.30, no.3, pp.355-379.

Cherp, A., I. Kopteva and R. Mnatsakanian (2003), Economic Transition and Environmental Sustainability: Effects of Economic Restructuring on Air Pollution in the Russian Federation, *Journal of Environmental Management*, vol.68, pp.141–151.

Chinn, J. (1977), *Manipulating Soviet Population Resources*, Macmillan, New York.

Clem, R., eds. (1986), *Research Guide to the Russian and Soviet Censuses*, Cornell University Press, Ithaca.

Cromley, E. and P. Craumer (1990), Physician Supply in the Soviet Union 1940-1985, *Geographical Review*, vol.80, no.2, pp.132-140.

Cromley, E. and P. Craumer (1992), Regional Patterns of medical Care Availability in the Former Soviet Union, *Post-Soviet Geography*, vol.33, no.4, pp.203-218.

DaVanzo, J. and C. Grammich (2001), *Dire Demographics: Population Trends in the Russian Federation*, RAND Corporation, Santa Monica.

Davis, C. and M. Feshbach (1980), *Rising Infant Mortality in the U.S.S.R. in the 1970's*, International Population Reports, Series P-95, No. 74, U.S. Department of Commerce, Bureau of the Census.

Denisova, I. (2010), Adult Mortality in Russia, *Economics of Transition*, vol.18. no.2, pp.333-363.

Dinkel, R. (1985), The Seeming Paradox of Increasing Mortality in a Highly Industrialized Nation: The Example of the Soviet Union, *Population Studies*, vol.39, no.1, pp.87-97.

Dubikaytis, T., Larivaara, M., Kuznetsova, O. and E. Hemminki (2010), Inequalities in Health and Health Service Utilisation among Reproductive Age Women in St. Petersburg, Russia: A Cross-Sectional Study, *BMC Health Services Research*, vol.10, no.307.

Dutton, J. (1981), Causes of Soviet Adult Mortality Increases, *Soviet Studies*, vol.33, no.4, pp.548-559.

Feshbach, M. (1985), The Age Structure of Soviet Population: Preliminary Analysis of Unpublished Data, *Soviet Economy*, vol.1, no.2, pp.177-193.

Gavrilova, N., V. Semyonova, E. Dubrovina, G. Evdokushkina, A. Ivanov and L. Gavrilov (2008), Russian Mortality Crisis and the Quality of Vital Statistics, *Population Research and Policy Review*, vol.27, no.5, pp.551-574.

Gil, A., Polikina, O., Koroleva, N., Leon, D. and M. McKee (2010), Alcohol Policy in a Russian Region: A Stakeholder Analysis, *European Journal of Public Health*, vol.20, no.5, pp.588-594.

Goldman, M. (1972), *The Spoils of Progress: Environmental Pollution in the Soviet Union*, MIT Press.

Goskomstat Rossii, *Demograficheskii ezhegodnik Rossii*, Goskomstat Rossii, Moscow, various years. (in Russian)

Heleniak, T. (1995), Economic Transition and Demographic Change in Russia, 1989-1995, *Post-Soviet Geography*, vol.36, no.7, pp.446-458.

Hill, F. and C. Gaddy (2003), *Siberian Curse: How Communist Planners Left Russia out in the Cold*, Brookings Institution Press, Washington DC.

Huffman, S. and M. Rizov (2010), The Rise of Obesity in Transition: Theory and Empirical Evidence from Russia, *Journal of Development Studies*, vol.46, no.3, pp.574-594.

Ivaschenko, E. (2005), The Patterns and Determinants of Longevity in Russia's Regions: Evidence from Panel Data, *Journal of Comparative Economics*, vol.33, no.4, pp.783-313.

Jones, E. and F. Grupp (1983), Infant Mortality Trends in the Soviet Union, *Population and Development Review*, vol.9, no.2, pp.213-246.

Jones, E. and F. Grupp (1984), On Infant Mortality in the Soviet Union: A Rejoinder, *Population and Development Review*, vol.10, no.1, pp.98-102.

Khalturina, D. and A. Korotaev (2006), *Russkii krest: factory, mekhanizmy I puti preodoleniya demograficheskogo krizisa v Rossii*, URSS, Moscow. (in Russian)

Kim, S. and W. Pridemore (2005), Social Support and Homicide in Transitional Russia, *Journal of Criminal Justice*, vol.33, no.6, pp.561-572.

Kingkade, W. (1987), Demographic Trends in the Soviet Union in Gorbachev's Economic Plans, in *Study Papers Submitted to the Joint Economic Committee*, Congress of the United States, Washington, D.C.: U.S. Government Printing Office, Vol. I, pp.166-186.

Kontorovich, V. (2001), The Russian Health Crisis and the Economy, *Communist and Post-Communist Studies*, vol.34, no.2, pp.221-240.

Kotryarskaya, E. (1990), *Zhenshny, cem'ya, deti*, Novosti, Moscow. (in Russian)

Kozlov, M. (2004), Retrospective Analysis of the Age at Death in Two Heavily Polluted and Two Unpolluted Russian Towns, *Chemosphere*, vol.56, pp.405-410.

Kumo, K. (2004), Soviet Industrial Location: A Re-examination, *Europe-Asia Studies*, vol.56, no.4, pp.595-613.

Kumo, K. (2010), Explaining Fertility Trends in Russia, *VoxEU* (June 2).

Larson, B., S. Avaliani, A. Golub, S. Rosen, D. Shaposhnikov, E. Strukova and J. Vincent (1999), The Economics of Air Pollution Healt Risk in Russia: A Case Study of Volgograd, *World Development*, vol.27, no.10, pp.1803-1819.

Leon, D. and L. Chenet (1997), Huge Variation in Russian Mortality Rates 1984-94: Artefact, Alcohol, or What? *Lancet*, vol.350, no.9075, pp.383-388.

Leon, D., Saburova, L., Tomkins, S., Andreev, E., Kiryanov, N., McKee, M. and V. Shkolnikov (2007), Hazardous Alcohol Drinking and Premature Mortality in Russia: A Population Based Case-Control Study, *Lancet*, vol.369, no.9578, pp.2001-2009.

Leon, D., Shkolnikov, V. and M. McKee (2009), Alcohol and Russian Mortality: A Continuing Crisis, *Addiction*, vol.104, no.10, pp.1630-1636.

Levin, A. (1979), *Lichnye material'nye i dukhovnye potrebnosti sovetskogo cheloveka i ikh udovletvorenie*, Izdatel'stvo Progress, Moscow. (in Russian)

Maddison, A. (2007), *The World Economy: A Millennial Perspective/Historical Statistics*, Development Centre Studies, OECD.

Malyutina, S., Bobak, M., Kurilovitch, S., Nikitin, Y. and M. Marmot (2004), Trends in Alcohol Lntake by Education and Marital Status in An Urban Population in Russia between the Mid 1980s and the Mid 1990s, *Alcohol and Alcoholism*, vol.39, no.1, pp.64-69.

McKee, M. (2006), Commentary: The Health Crisis in the USSR: Looking behind the Facade, *International Journal of Epidemiology*, vol.35, no.6, pp.1398-1399.

Ministry of Health and Welfare of Japan (1962), *Annual Report on Health and Welfare* <http://wwwhakusyo.mhlw.go.jp/wpdocs/hpaz196101 /b0176.html> . (in Japanese)

Ministry of Health, Labor and Welfare of Japan (2007), Life Table No.20 <http://www.mhlw.go.jp/toukei/saikin/ hw/life/20th/dl/gaiyo.pdf>. (in Japanese)

Nemtsov, A. (2002), Alcohol-Related Human Losses in Russia in the 1980s and 1990s, *Addiction*, vol.97, no.11, pp.1413-1425.

Nemtsov, A. (2003), Suicides and Alcohol Consumption in Russia, 1965-1999, *Drug and Alcohol Dependence*, vol.71, no.2, pp.161-168.

Osipov, G. and S. Ryazantsev, eds. (2009), *Atlas demograficheskogo razvitiya Rossii*, Ekonomicheskoe obrazovanie, Moscow. (in Russian)

Perlman, F. and M. Bobak (2008), Socioeconomic and Behavioral Determinants of Mortality in Posttransition Russia: A Prospective Population Study, *Annals of Epidemiology*, vol.18, no.2, pp.92-100.

Perlman, F. (2010), Drinking in Transition: Trends in Alcohol Consumption in Russia 1994-2004, *BMC Public Health*, vol.10, no.691.

Pomerleau, J., M. McKee, R. Rose, C. Haerpfer, D. Rotman and S. Tumanov (2008), Hazardous Alcohol Drinking in the Former Soviet Union: A Cross-Sectional Study of Eight Countries, *Alcohol and Alcoholism*, vol.43, no.3, pp.351-359.

Pridemore, W. (2002), Vodka and Violence: Alcohol Consumption and Homicide Rates in Russia, *American Journal of Public Health*, vol.92, no.12, pp.1921-1930.

Pridemore, W. (2004), Weekend Effects on Binge Drinking and Homicide: The Social Connection Between Alcohol and Violence in Russia, *Addiction*, vol.99, no.8, pp.1034-1041.

Pridemore, W. (2005), Social Structure and Homicide in Post-Soviet Russia, *Social Science Research*, vol.34, no.4, pp.732-756.

Pridemore, W. (2006), Heavy Drinking and Suicide in Russia, *Social Forces*, vol.85, no.1, pp.413-430.

Pridemore, W. and M. Chamlin (2006), A Time-Series Analysis of the Impact of Heavy Drinking on Homicide and Suicide Mortality in Russia, 1956-2002, *Addiction*, vol.101, no.12, pp.1719-1729.

Pridemore, W., Tomkins, S., Eckhardt, K., Kiryanov, N. and L. Saburova (2010), A Case-Control Analysis of Socio-Economic and Marital Status Differentials in Alcohol- and

Non-Alcohol-Related Mortality among Working-Age Russian Males, *European Journal of Public Health*, vol.20. np.5, pp.569-575.

Ramstedt, M. (200), Fluctuations in Male Ischaemic Heart Disease Mortality in Russia 1959-1998: Assessing the Importance of Alcohol, *Drug and Alcohol Review*, vol.28, no.4, pp.390-395.

Rapawy, S. and G. Baldwin (1982), Demographic Trends in the Soviet Union: 1950-2000 in Soviet Economy in the 1980's: Problems and Prospects, in *Selected Papers Submitted to the Joint Economic Committee*, Congress of the United States, U.S. Government Printing Office, Washington, D.C, Vol. II, pp.265-322.

Razvodovsky, Y. (2009a), Beverage-Specific Alcohol Sale and Suicide in Russia, *Crisis*, vol.30, no.4, pp.186-191.

Razvodovsky, Y. (2009b), Suicide and Fatal Alcohol Poisoning in Russia, 1956-2005, *Drugs*, vol.16, no.2, pp.127-139.

Razvodovsky, Y. (2010), Beverage-Specific Alcohol Sales and Violent Mortality in Russia, *Addictiones*, vol.22, no.4, pp.311-315.

Razvodovsky, Y. (2011), The Effects of Beverage Type on Suicide Rate in Russia, *Psychiatria Danubina*, vol.23, no.4, pp.378-383.

Revich, B. and D. Shaposhnikov (2008), Temperature-Induced Excess Mortality in Moscow, Russia, *International Journal of Biometeorology*, vol.52, no.5, pp.367-374.

Shkolnikov, V., Cornia, A., Leon, D. and F. Mesle (1998), Causes of the Russian Mortality Crisis: Evidence and Interpretations, *World Development*, vol.26, no.11, pp.1995-2011.

Shkolnikov, V., McKee, M. and D. Leon (2001), Changes in Life Expectancy in Russia in the mid-1990s, *Lancet*, vol.357, no.9260, pp.917-921.

Stickley, A., Razvodovsky, Y. and M. McKee (2009), Alcohol Mortality in Russia: A Historical Perspective, *Public Health*, vol.123, no.1, pp.20-26.

Stuckler, D., L. King, and M. McKee (2009), Mass Privatisation and the Post-Communist Mortality Crisis: A Cross-National Analysis, *Lancet*, vol.373, no.9661, pp.399-407.

Tekin, E. (2004), Employment, Wages, and Alcohol Consumption in Russia, *Southern Economic Journal*, vol.71, no.2, pp.397-417.

Tkatchenko, E, M. McKee and A. Tsouros (2000), Public Health in Russia: The View from the Inside, *Health Policy Planning*, vol.15, pp.164–169.

Tolts, M. (2008), Population Trends in the Russian Federation: Reflections on the Legacy of Soviet Censorship and Distortions of Demographic Statistics, *Eurasian Geography and Economics*, vol.49, no.1, pp.87-98.

Treml, V. and J. Hardt, eds. (1972), *Soviet Economic Statistics*, Duke University Press, Gurham.

Treml, V. (1982), *Alchol in the USSR: A Statistical Study*, Duke University Press, Durham.

Treml, V. (1997), Soviet and Russian Statistics on Alcohol Consumption and Abuse, Bobadilla, J., C. Costello and F. Mitchell eds., *Premature Death in the New Independent States*, National Academic Press, Washington, 220-238.

Tsentralnoe Statisticheskoe Upravlenie (TsSU) SSSR (1928a), *Estestvennoe dvizhenie naseleniia soiuza ssr 1923-1925*, TsSU, Moskva. (in Russian)

Tsentralnoe Statisticheskoe Upravlenie (TsSU) SSSR (1928b), *Estestvennoe dvizhenie naseleniia soiuza ssr v 1926 g.*, TsSU, Moskva. (in Russian)

Twigg, J. (2008), A Habit That's Hard to Kick: The Evolution of Tobacco Control Policy in Russia, *Russian Analytical Digest*, vol.35, no.8, pp.2-5.

United Nations (2001), *Principles and Recommendations for a Vital Statistics System Revision 2*, United Nations, New York.

United Nations in the Russian Federation (UN Russia) (2008), *Demographic Policy in Russia: From Reflection to Action*, United Nations in the Russian Federation, Moscow.

Vishnevskiy, A. eds. (2006), *Demograficheskaya modernizatsiya Rossii 1900-2000*, Novoe izdatel'stvo, Moscow. (in Russian)

Vishnevskiy, A. eds. (2009), *Naselenie Rossii 2007*, pyatnadtsatyi ezhegodnyi demograficheskii doklad, VSE, Moscow. (in Russian)

Vishnevsky, A. and S. Bobylev, eds. (2009), *National Human Development Report: Russian Federation 2008. Russia Facing Demographic Challenges*, The United Nations Development Programme in Russian Federation, Moscow.

Webster, P. (2003), Infant Mortality Is Falling in Russia, Latest Figures Suggest, *Lancet*, vol.361, no.9359, p.758.

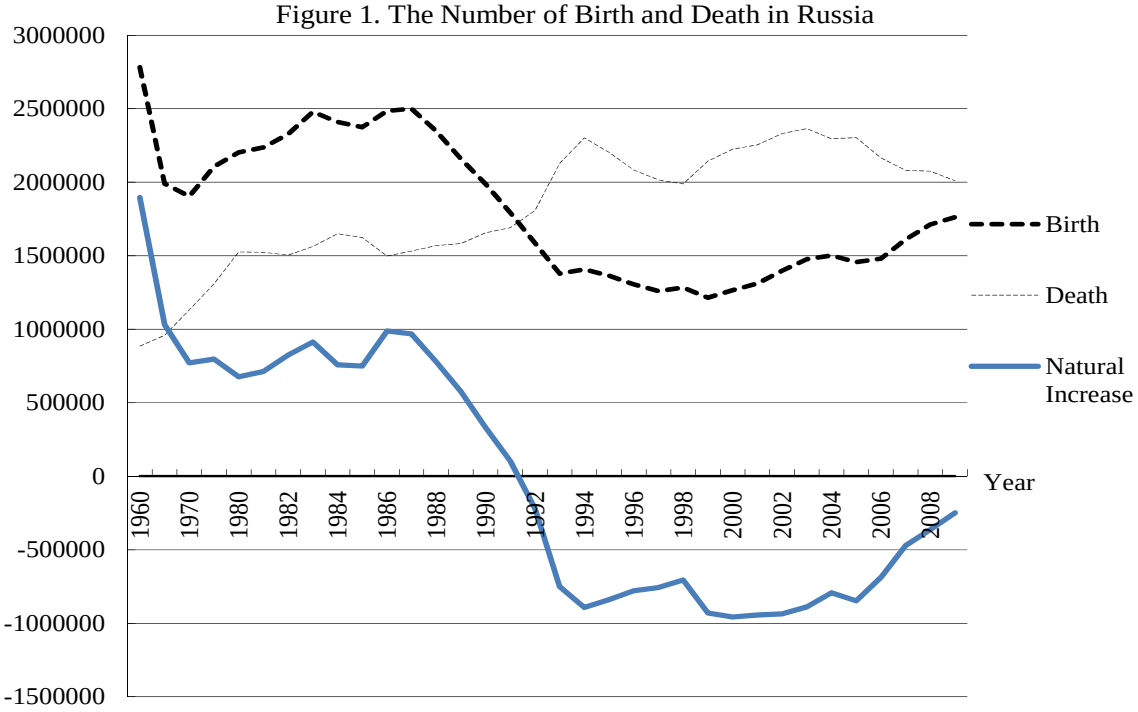
World Health Organization (WHO) (2011), *Global Status Report on Alcohol and Health*, WHO.

Wilson, D. and R. Purushothaman (2003), *Dreaming With BRICs: The Path to 2050*, Global Economics Paper No.99, Goldman Sachs, GS Global Economics Website.

Zaridze, D., D. Maximovitch, A. Lazarev, V. Igitov, A. Boroda, J. Boreham, P. Boyle, R. Peto and P. Boffetta (2009a), Alcohol Poisoning Is a Main Determinant of Recent Mortality Trends in Russia: Evidence from a Detailed Analysis of Mortality Statistics and Autopsies, *International Journal of Epidemiology*, vol.38, no.1, pp.143-153.

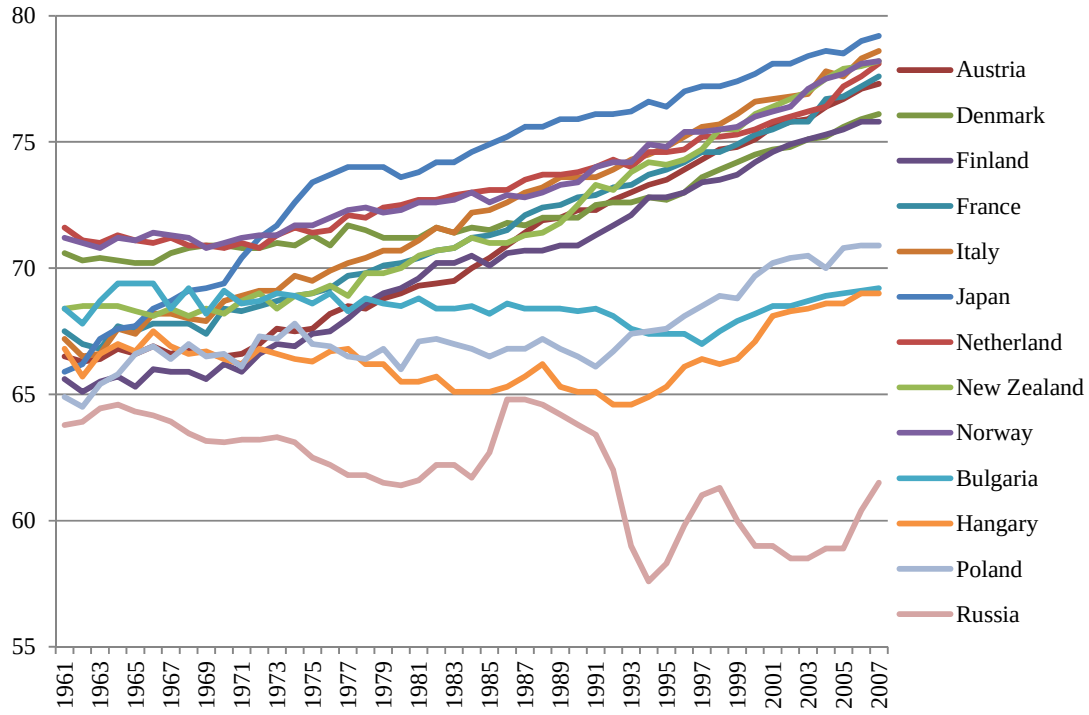
Zaridze, D., Brennan, P., Boreham, J., Boroda, A., Karpov, R., Lazarev, A., Konobeevskaya, I., Igitov, V., Terechova, T., Boffetta, P. and R. Peto (2009b), Alcohol and Cause-Specific Mortality in Russia: A Retrospective Case-Control Study of 48557 Adult Deaths, *Lancet*, vol.373, no.9682, pp.2201-2214.

Figure 1. The Number of Birth and Death in Russia



(Prepared by the author from Rosstat, *Demograficheskii ezhegodnik Rossii*, various years)

Figure 2. Male Life Expectancy at Birth (Year)



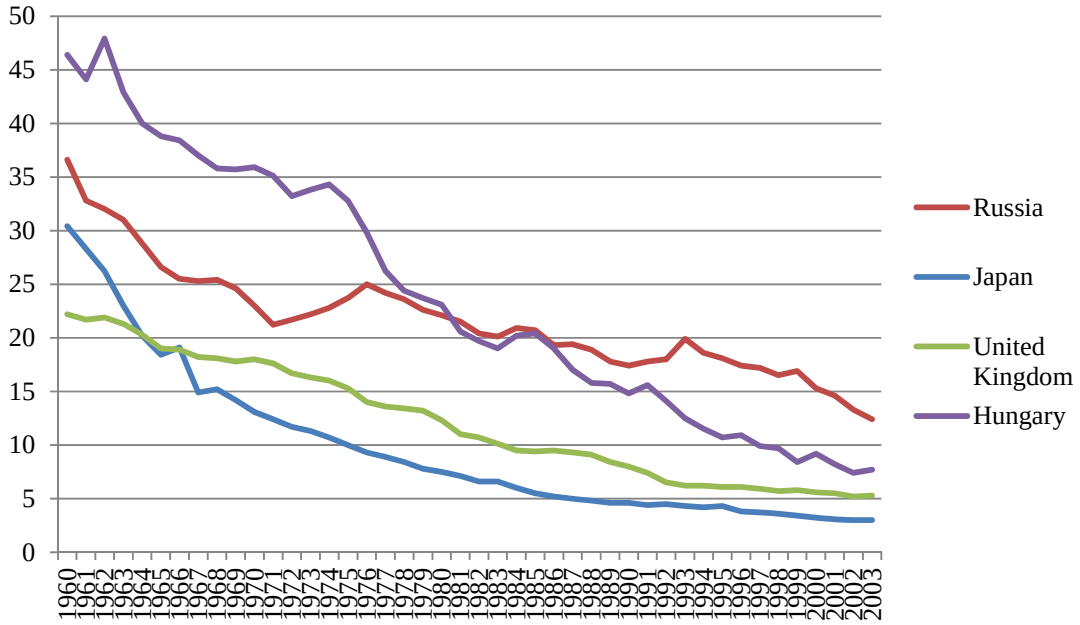
(Prepared by the author from World Bank, *World Development Indicators 2009* and Rosstat, *Demograficheskii ezhegodnik Rossii*, various years)

Table 1. Age-Specific Mortality in Russia

y.o/Year	1990		1995		2000		2005		2009		Ref.: Japan 2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	20.0	14.7	20.5	15.5	13.9	13.2	12.5	9.4	9.1	7.1	3.4	3.0
5-9	0.7	0.4	0.7	0.4	0.5	0.4	0.5	0.3	0.4	0.3	0.1	0.1
10-14	0.6	0.3	0.7	0.4	0.6	0.3	0.5	0.3	0.4	0.3	0.1	0.1
15-19	1.6	0.6	2.4	0.9	1.7	0.8	1.6	0.7	1.3	0.6	0.5	0.2
20-24	2.6	0.7	4.4	1.0	3.9	1.1	3.8	1.0	2.7	0.8	0.7	0.3
25-29	3.3	0.8	5.6	1.3	5.9	1.3	6.5	1.6	4.6	1.3	0.7	0.3
30-34	4.3	1.1	7.4	1.8	7.5	1.7	8.2	2.2	6.8	1.9	0.9	0.4
35-39	5.6	1.6	10.2	2.5	10.2	2.3	10.3	2.9	7.7	2.4	1.1	0.6
40-44	7.7	2.4	14.3	3.9	14.4	3.4	14.3	4.3	9.8	3.2	1.8	1.0
45-49	11.7	3.8	19.5	5.8	20.1	5.1	19.4	5.6	13.5	4.3	3.0	1.5
50-54	16.1	5.4	27.5	8.5	27.9	7.6	26.9	8.1	19.4	6.2	4.6	2.3
55-59	23.5	8.6	34.3	11.5	35.0	11.4	34.4	11.8	27.1	6.4	7.5	3.2
60-64	34.2	13.5	46.4	17.2	49.8	15.8	47.0	16.5	38.5	13.2	11.3	4.6
65-69	46.6	22.0	60.6	26.0	60.6	25.6	58.8	12.8	51.9	20.5	18.2	7.5
70-74	67.7	37.1	77.6	41.2	84.1	41.2	80.5	39.4	70.6	32.8	28.7	12.4
75-79	100.2	62.3	109.7	68.5	111.9	67.5	109.8	66.0	99.8	58.3	45.6	22.7
80-84	146.6	105.9	156.6	115.0	149.0	114.9	139.2	107.3	136.3	98.9	80.5	43.3

(Prepared by the author from Rosstat, *Demograficheskii ezhegodnik Rossii*, various years, and Ministry of Health, Labor and Welfare of Japan, 2007)

Figure 3. Infant Mortality Rate, 1960-2003, 1/1000.



(Prepared by the author from World Bank, *World Development Indicators 2009* and Rosstat, *Demograficheskii ezhegodnik Rossii*, various years)

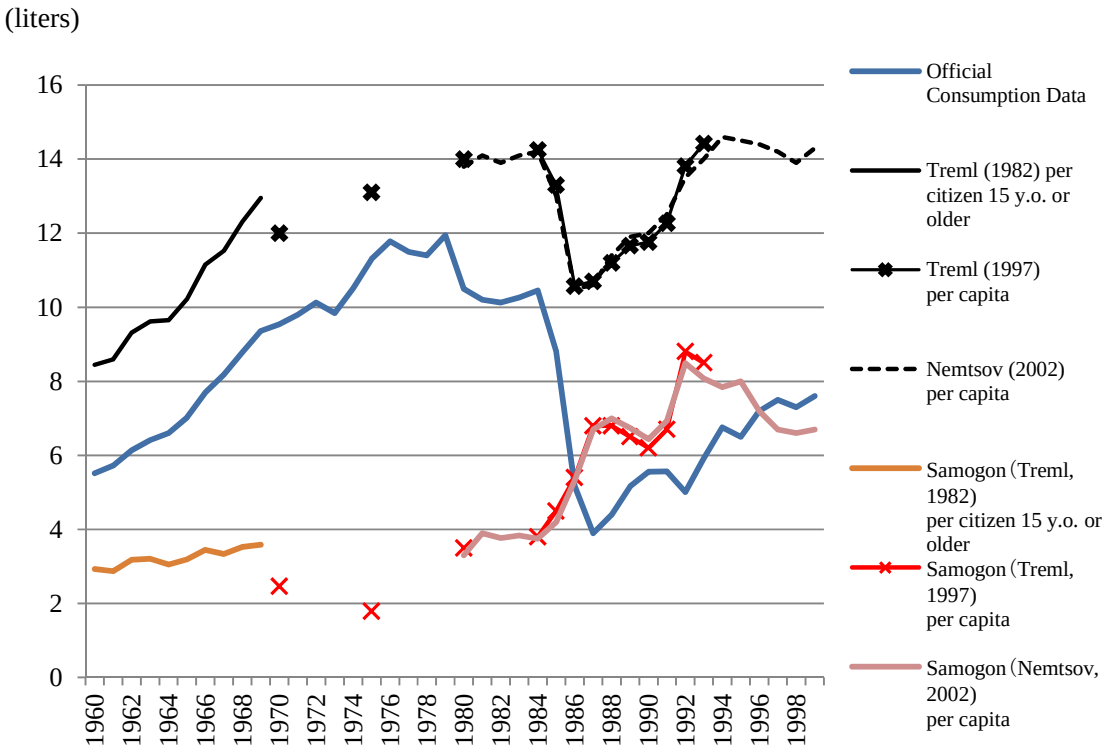
Table 2. Alcohol Consumption per capita/per citizen 15 year old or older seen in Previous Studies (in Pure Alcohol, Liters)

	Official Consumption Data	Treml (1982) per citizen 15 y.o. or older	Treml (1997) per capita	Nemtsov (2002) per capita	Estimation of Underground Alcohol Beverage Production (Treml, 1982) per citizen 15 y.o. or older	Estimation of Underground Alcohol Beverage Production (Treml, 1997) per capita	Estimation of Underground Alcohol Beverage Production (Nemtsov, 2002) per capita
1960	5.52 [1]	8.45			2.93		
1961	5.72 [1]	8.59			2.87		
1962	6.14 [1]	9.32			3.18		
1963	6.41 [1]	9.62			3.21		
1964	6.6 [1]	9.65			3.05		
1965	7.02 [1]	10.21			3.19		
1966	7.7 [1]	11.15			3.45		
1967	8.18 [1]	11.52			3.34		
1968	8.78 [1]	12.31			3.53		
1969	9.36 [1]	12.95			3.59		
1970	9.54 [1]		12			2.46	
1971	9.8 [1]						
1972	10.13 [1]						
1973	9.84 [1]						
1974	10.51 [1]						
1975	11.31 [1]		13.1			1.79	
1976	11.78 [1]						
1977	11.5 [1]						
1978	11.4 [1]						
1979	11.94 [1]						
1980	10.5 [2]		14	13.8		3.50	3.3
1981	10.2 [2]			14.1			3.9
1982	10.13 [2]			13.9			3.77
1983	10.26 [2]			14.1			3.84
1984	10.45 [2]		14.25	14.2		3.8	3.75
1985	8.8 [2]		13.3	13		4.5	4.2
1986	5.17 [2]		10.57	10.5		5.4	5.33
1987	3.9 [2]		10.7	10.6		6.8	6.7
1988	4.4 [2]		11.2	11.4		6.8	7
1989	5.16 [2]		11.66	11.9		6.5	6.74
1990	5.56 [2]		11.76	12		6.2	6.44
1991	5.57 [2]		12.27	12.5		6.7	6.93
1992	5.01 [2]		13.81	13.5		8.8	8.49
1993	5.92 [2]		14.42	14		8.5	8.08
1994	6.76 [2]			14.6			7.84
1995	6.5 [2]			14.5			8
1996	7.2 [2]			14.4			7.2
1997	7.5 [2]			14.2			6.7
1998	7.3 [2]			13.9			6.6
1999	7.6 [2]			14.3			6.7

1: Treml (1982), p.68; 2: Nemtsov (2002), p.1414.

(Prepared by the author)

Figure 4. Alcohol Consumption per capita/per citizen 15 year old or older seen in Previous Studies (in Pure Alcohol, Liters)



(Prepared by the author from Table 2)

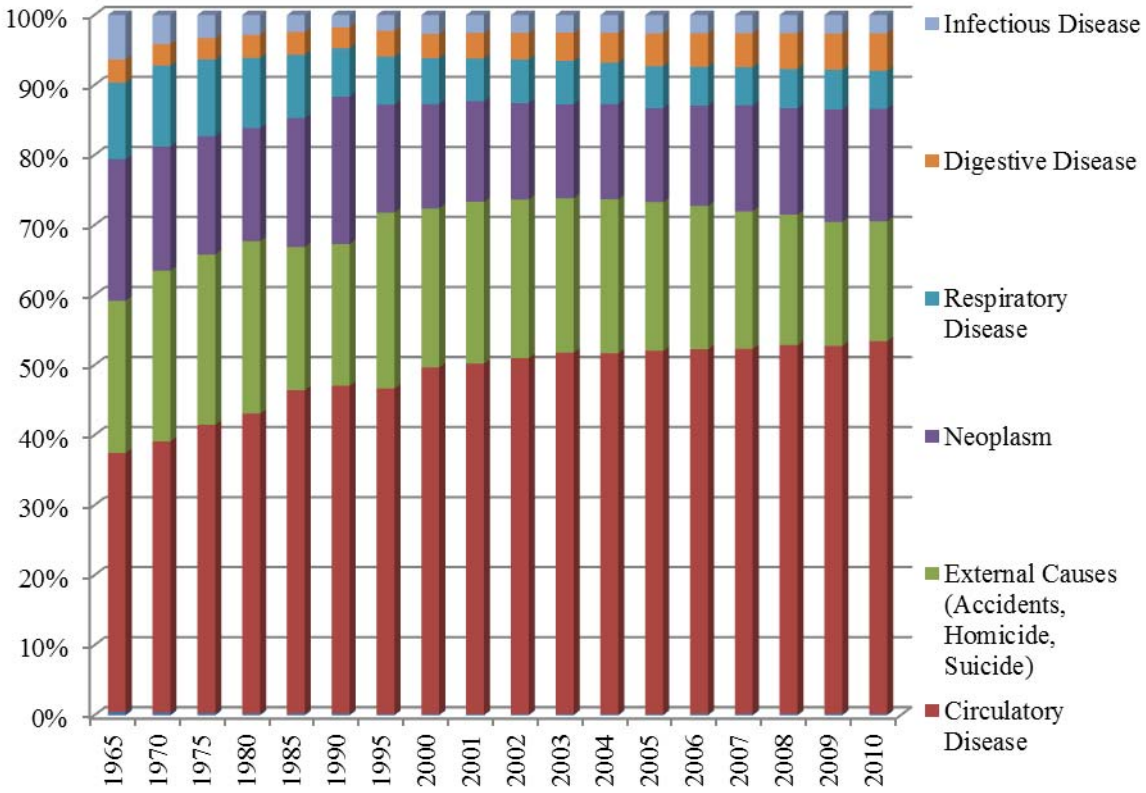
Table 3. Previous Studies on Alcohol Consumption and Mortality in Russia

Macro-Level Data				
	Approach	Data, Years etc.	Dependent Variable	Explaining Variable
Nemtsov (2002)	OLS	1970-75, 80-91	Mortality	Alcohol Consumption per capita
Pridemore (2002)	2SOLS	1995, 78 regions	Homicide Rate by Region	Death from Alcohol Poisoning
Nemtsov (2003)	ARIMA	1965-1999	Suicide Rate	Alcohol Consumption per capita
Kim *et al.* (2005)	2SOLS	2000, 79 regions	Homicide Rate by Region	Alcohol Sales per capita
Pridemore (2005)	Poisson	1995, 78 regions	Homicide Rate by Region	Death from Alcohol Poisoning
Pridemore (2006)	OLS	2000, 78 regions	Suicide Rate by Region	Death from Alcohol Poisoning
Pridemore *et al.* (2006)	ARIMA	1956-02	Suicide/Homicide Rate	Death from Alcohol Poisoning
Razdovsky (2009a)	ARIMA	1956-05	Suicide Rate	Death from Alcohol Poisoning
Razdovsky (2009b)	ARIMA	1970-05	Suicide Rate	Sales of Vodla (Vodka affects more critically than other beverages)
Ramstedt (2009)	ARIMA	1959-98	Death from Ischemic Heart Disease	Alcohol Sales per capita
Razdovsky (2010)	ARIMA	1980-05	External Causes of Death	Sales of Vodla (Vodka affects more critically than other beverages)
Razvodovsky (2011)	ARIMA	1980-05	Suicide Rate	Sales of Vodla (Vodka affects more critically than other beverages)

Micro-Data				
	Approach	Data, Years etc.	Explained Variable	Explaining Variable, or Main Results
Brainerd *et al.* (2005)	Logistic Regression	1994-2002, RLMS, 17,092 cases.	Death	Amount of Alcohol taken
Leon *et al.* (2007)	Descriptive (Case-Control Study)	2003-2005, Survey in Izhevsk, 1,468 cases; 1,496 controls.	Death	37 % of cases took non-beverage alcohol; Only 7% among controls. Cases took alcohol more frequently than controls.
Perlman *et al.* (2008)	Cox Hazard	1994-2001, RLMS, 11,359 cases.	Death	Frequency of Taking Alcohol
Pomerleau *et al*. (2008)	Descriptive	2001, Armenia, Belorus, Georgeam Kazakhstan, Kyrgyzia, Moldova, Ukraine and Russia, 18,428 respondents	—	Frequency of binge drinking (2 liters or more beer/750 g. or more wine/ 250 g. or more vodka once) is significantly higher in Russia than in others.
Zaridze *et al.* (2009a)	Descriptive	1991-2006, Barnaul city, Autopsy Data, 24,836 cases	Death from Circulatory Disease	During the period of 1991-1994 and 1998-2000, when Russia faced sever circumstances, blood concentration of alcohol among cases who died from circulatory diseases was critically high.
Zaridze *et al.* (2009b)	Descriptive (Case-Control Study)	1990-2001, Tomsk, Barnaul and Vysk cities, Mortality by Causes of Death, 43,082 caes; 5,475 controls.	Mortality by Causes of Death	Mortality for people who took large amount of alcohol is significantly high.
Leon *et al.* (2010)	Descriptive	2003-2005, Survey in Izhevsk, 1,750 cases.	Death from Circulatory Disease	Blood concentration of alcohol is critically high for cases dead from circulatory diseases.
Denisova (2010)	Cox Hazard	1994-2007, RLMS, 27,723 cases	Death	Amount of Alcohol taken
Pridemore *et al.* (2010)	Descriptive (Case-Control Study)	2003-2005, Survey in Izhevsk, 1,559 cases; 1,635 controls.	Death	34 % of cases took non-beverage alcohol; Only 4% for controls.

Note: Results for other explaining variables are omitted and only those concerning alcohol consumption are described.
(Prepared by the author)

Figure 5. Death by Causes of Death for Male in Russia



(Prepared by the author from Rosstat, *Demograficheskii ezhegodnik Rossii*, various years)