Abstract

Using data from the 1994-2009 Russian Longitudinal Monitoring Survey of the Higher School of Economics (RLMS-HSE), this study examines trends in health expectancy among working-age individuals in contemporary Russia. The macro-level correlates of health expectancy are also identified. The analyses from the Sullivan method show that Russians have experienced substantial improvements in health-related quality of life throughout the post-Soviet period, suggesting that people are now living longer and healthier lives. Also, macroeconomic indicators, including per-person GDP, unemployment rates, and inflation rates, are closely associated with health expectancy. Efforts toward stabilizing the country's macroeconomic circumstances might yield health benefits for Russians.

Introduction

The health status of Russians has drastically declined since the collapse of the Soviet Union in 1991 (Cockerham, 1997). Between 1991 and 1994, the age-adjusted mortality rate increased by 39 percent, and life expectancy at birth consequently dropped by 6.03 years for men and 3.16 years for women during the same period (Notzon et al., 1998). The high toll of premature deaths was concentrated among working-age individuals, particularly men (Cockerham, 1999), and cardiovascular diseases and external causes of death, including accidents, violence, and suicide, constituted their mortality profile (Brainerd and Cutler, 2005). Surprisingly, mortality rates among vulnerable groups, namely infants and older adults, remained almost unchanged throughout the transition period (Murphy, 2011). Declines in subjective assessments of health status have also been reported, as in Carlson (2001)'s research on the self-rated health status of Russians. Several explanations for the post-1991 health crisis have been discussed in the literature. These include stressful socioeconomic circumstances during the transition period (Abbott, Turmov, and Wallace, 2006; Abbott and Wallace, 2007; Round and Williams, 2010), the breakdown of the Soviet health care system (Balabanova et al., 2004; Nolte, McKee, and Scholz, 2004), and health-damaging behaviors among citizens, characterized by excessive alcohol consumption and heavy smoking (Cockerham, 2000; McKee et al., 1998; Leon, Shkolnikov, and McKee, 2009; Shkolnikov, McKee, and Leon, 2001).

Although the disintegration of the Soviet regime has had devastating health consequences to Russians, there are some indications of improvement in population health status in recent years. Life expectancy at birth, for instance, has progressively increased for both men and women since the early 2000s; in 2010, life expectancy at birth stood 62.59 years for men and 74.79 years for women, levels approaching the pre-1991 period. Recent upward trends in

longevity raise the critical question of whether observed increases in life expectancy are accompanied by reductions in morbidity. In other words, are the Russian people now enjoying longer as well as healthier lives?

Three hypotheses help us answer this question: (1) lengthening life expectancy with deteriorating health, or the expansion of morbidity hypothesis (Gruenberg, 1977); (2) a longer period of life paralleled by a delay in the onset of disease, or the compression of morbidity hypothesis (Fries, 1980); and (3) a balanced relationship between health and longevity, or the dynamic equilibrium hypothesis (Manton, 1982). These theoretical models are based on the concept of "health expectancy." For decades, health has been understood in terms of the duration of life, often measured by life expectancy at birth. However, it is increasingly recognized that population health status cannot be fully understood by traditional mortality-based indicators alone, since people can experience longer life but worsening health (Crimmins, Hayward, and Saito, 1994). Health expectancy considers both mortality and morbidity and estimates the average duration of life in which people can expect to live a given health state (Robine et al., 2003). A variety of health indicators have been used to compute health expectancy. For example, "healthy life expectancy" (HLE) denotes the number of years expected to spend in a healthy state. This indicator is usually based on the response categories to self-rated health. "Disability-free life expectancy" (DFLE) refers to the expected length of life in which an individual's health does not affect his or her ability to perform specific activities. Another approach developed by the Global Burden of Disease (GBD) project quantifies the weights of specific diseases, injuries, and risk factors, and estimates time spent in health states less than full health due to health problems (Mathers et al., 2001). Overall, health expectancy has been widely used as a standard summary measure of population health status.

The idea of health-related quality of life is fundamentally important for contemporary Russia. The aging population and a decline in the number of economically-active individuals due to very low fertility rates in recent years have prompted policy debates over revising the retirement age. According to the International Monetary Fund (IMF), the retirement age, currently 60 years for men and 55 years for women, needs to be extended to 63 years for both genders in order to sustain the country's pension system (Eich, Gust, and Soto, 2012). The assumption underlying the proposed change appears to be the compression of morbidity thesis, characterized by increasing life expectancy and improving health. If the health status of working-age individuals is improving, it follows that their ability to work could also rise, and thus the age of retirement should increase accordingly.

Empirical evidence to support this argument, however, is scarce. Although studies examining mortality-based measures abound (see, for example, Cockerham, 1997; Kennedy Kawachi, and Brainerd, 1998; Notzon et al., 1998; Perlam, Bobak, and Marmot, 2004; Sholoknikov, et al., 1998), few researchers to date have focused on health-related quality of life among Russians. One exception is a cross-national study by Andreev and his colleagues (2003), which documents the substantial disadvantages of Russians in terms of health expectancy measures. For example, differences in HLE at age 65 between Russia and Western Europe amounted to 5.8 years among men and 8.2 years among women. Analysis, however, is based on a single cross-sectional study from 1995, and thus the study tells us little about long-term trends in the overall population health status of Russians. Also, using the GBD approach, analysis by Salomon et al. (2012) describes changes in HLE among Russians between 1990 and 2010 (from 55.5 years to 55.4 years for men, and from 63.6 years to 64.5 years for women), but HLE in this study is measured only at birth. As a consequence, we lack a firm understanding of how the

health status of those at adult ages has changed throughout the post-Soviet period. It is a consistent finding that middle-aged individuals were particularly hit hard by the mortality crisis of the 1990s (Cockerham, 1999). Taken together, due to the narrow scope of research, long-term trends in health-related quality of life among adults in Russia remain to be explored.

In addition, relatively little is known about the factors related to the overall health status of Russians. Since the pioneering study by Jagger et al. (2008), researchers have begun to identify factors linked to health expectancy. In this study, for example, a level of a nation's wealth, measured by GDP per capita and elderly care expenditures, is positively associated with the number of years spent without disability at age 50 across 25 European countries in 2005. Of particular importance in contemporary Russia is the role played by macroeconomic factors. The breakup of the Soviet Union caused economic disaster, exemplified by declining GDP, a sharp rise in unemployment rates, and hyperinflation, all over the country (EBRD, 1999). Further, in August 1998, a severe financial crisis hit the country, which led to the devaluation of the national currency, a default on government debt, and the collapse of the banking system (Buchs, 1999). The first decade following the collapse of the Soviet Union was characterized by economic catastrophe, but the Russian economy has gradually recovered since the early 2000s (Aslund, 2007). In fact, it seems that economic growth and improvements in longevity have taken place more or less simultaneously. Life expectancy at birth has steadily improved since the mid-2000s, and economic expansion began in the early 2000s. The relationship between macroeconomic conditions and population health status, however, remains to be tested. Brainerd (2001), for instance, finds that the state of macroeconomy is an important predictor of suicide mortality for the former communist countries of Eastern Europe; GNP per capita and employment to population ratio are inversely associated with male suicide death rates. Yet, it remains an open

question as to whether and to what extent macroeconomic indicators are associated with health-related quality of life among Russians. Abbott and Wallace (2007)'s qualitative study indeed demonstrates that difficult socioeconomic circumstances during the 1990s had negative impacts on people' quality of life and health in Russia, but no quantitative study has yet substantiated the relationship between macroeconomic conditions and the overall health status of Russians.

The present study has two related aims. The first aim of this research is to investigate trends in health expectancy among working-age individuals in contemporary Russia. Using data from the Russian Longitudinal Monitoring Survey of the High School of Economics (RLMS-HSE) for the period of 1994-2009, this study examines how the overall health status of Russian people has changed over the past two decades.[1] Specifically, this work focuses on self-rated health, morbidity, and disability, and estimates the following three types of health expectancy measures: (1) healthy life expectancy (HLE: the length of life spent in self-perceived good health); (2) morbidity-free life expectancy (MFLE: the length of life lived without any health problems); and (3) disability-free life expectancy (DFLE: the length of life in which health conditions do not limit the fulfillment of a person's social role). Using these three indicators of health, this study further aims to assess the relationship, if any, of macroeconomic conditions and health expectancy among Russian men and women. Overall, investigations into long-term trends in overall population health status and its correlates can contribute to current policy debates over a potential changes in the retirement age in the country.

In what follows, I describe the data, measures, and analytical procedure. I first present some results of trends in health expectancy measures between 1994 and 2009, and I then assess

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the relationship between healthy expectancy and macroeconomic indicators, including GDP, unemployment rates, and inflation rates. I conclude with a discussion of the key findings, study limitations, and some directions for future research.

Data and Methods

Data

The computation of health expectancy in this study is based on the Sullivan method (1971). It utilizes data from life tables and information about the prevalence of age-specific health conditions taken from a social survey. Life tables come from the Human Mortality Database (HMD). The survey data used for this study are from the RLMS-HSE. It is a household-based survey designed to monitor the socioeconomic conditions of those living in the Russian Federation, using interview-administered questionnaires. This survey is ideal for the current project, because (1) the data are nationally representative; (2) it has been conducted over the past two decades; (3) and a variety of health-related indicators are included. This study uses in total 14 waves of the RLMS-HSE Phase II, spanning from 1994 to 2009.

The sample is limited to men and women aged between 15 and 54, reflecting the current retirement age in Russia. Note that, although the official retirement age for men is 60, given that the age of retirement for women is 55, the upper age limit is set at age 54. By restricting the age interval to ages 15-54, the present study computes an age-specific form of health expectancy, that is, partial health expectancy. This measurement provides a unique opportunity to analyze the health of those within a specific age range. As discussed above, middle-aged individuals were particularly hit hard by the post-Soviet mortality crisis. Therefore, partial health expectancy allows me to examine the health status of those who are potentially vulnerable to health shocks

in the Russian context. Since the levels of missing values on either health conditions or age are low (less than 1.0 percent of each sample for men and women), those with missing data were dropped from the analysis.

Measures

Health Expectancy: The following three types of health expectancy measures are estimated: HLE, MFLE, and DFLE. First, HLE refers to the expected duration of life spent in a health state. It is based on self-rated health and refers to the length of life expected to spend in good health. Self-rated health is the most inclusive form of health measure, and a key predictor of health and mortality risks (Idler and Angel, 1990; Idler and Benyamini, 1997; Jylha, 2011). In the RLMS-HSE, the respondents are asked about their general health condition: "All in all, how would you describe your state of health these days?" There are five response categories: "very poor," "poor," "fair," "good," and "very good." The present study combines "good" and "very good" to compute the expected number of years spent in "good health." Some earlier studies consider "fair" health together with "very good" and "good" categories (see, for example, Andreev, McKee, and Shkolinikov, 2003; Palosuo, 2000), but this work only focuses on "very good" and "good," given that including "fair" self-rated health would overestimate the duration of life spent in a healthy state.

Second, MFLE denotes the number of years lived without health problems. While self-rated health refers to overall health status, the prevalence of morbidity takes one step further and provides the information about the experience of actual health problems. Morbidity is measured with the question, "Have you had in the last 30 days any health problems?" Responses are given as "yes" or "no." MFLE is based on the proportion of respondents who answered "no" to this question.

Third, DFLE refers to the expected length of life in which the individual's ability to perform socially defined tasks is not restricted by health conditions. Disability is often measured by an individual's ability to perform specific activities, based on the prevalence of difficulties in activities of daily living (ADLs), or in instrumental activities of daily living (IADL) (Deeg, Verbrugge, and Jagger 2003). Contrariwise, this research follows the conceptual model developed by Verbrugge and Jette (1994) and defines disability as experienced difficulty performing social role activities expected for one's age and sex group. Focusing on the ability to perform expected social roles, DFLE in this study represents the most severe form of disablement (Verbrugge and Jette, 1994). The presence of disability is measured with the following survey item: "In the last 30 days did you miss any work or study days due to illness?" The answers are grouped into "yes" and "no." Respondents who answered "no" to this question are considered those without disability. The question wording and response categories for these three items remain constant across all the 16 waves.

Analytical design

The analysis has three parts. In the first part, I use the Sullivan (1971) method and estimate gender-specific HLE, MFLE, and DFLE between ages 15 and 54 for the period of 1994-2009. Details of the calculation of health expectancy in the Sullivan method are summarized elsewhere (Jgger et al., 2007), but, in summary, this method decomposes life expectancy after a given age into various health states based on the prevalence of health conditions. I first calculate partial life expectancy between ages 15 and 54, denoting the expected length of life between 15 and 54 based on current mortality rates, and I then estimate the average duration of partial life expectancy spent in a healthy state (HLE), without health problems (MFLE), and without disability (DFLE).

In the second part, I use ordinary least-squares (OLS) regression to explore a time trend in three health expectancy measures between 1994 and 2009. A variable that indicates the number of years since 1994 is regressed on health expectancy measures to determine how a change in the survey year is associated with the health-related quality of life of Russians. This is identical to Crimmins, Reynolds, and Saito (1999)'s analytical approach that assesses time trends in work ability and work limitations among older adults in the United States. Prior to estimating regression models, I confirmed linear relationships between the survey-year variable and each health expectancy measure for men and women.

Finally, the association between macroeconomic indicators and health expectancy is tested. In line with prior research on the macro-level correlates of population health status (Brainerd 2001; Ram, 2006; Wilkinson 1992), I focus on the following three factors: GDP per capita (divided by 1,000 and logged), unemployment rates (in percent), and inflation rates (in percent, logged). I enter each variable separately into the model and estimate the bivariate relationships between these indicators and HLE, MFLE, and DFLE. Here, I use generalized-least squares (GLS) regression models and incorporate standard errors of dependent variables in equations. The standard errors of health expectancy measures are calculated using the formula provided by Jagger et al. (2007). Data were analyzed using the statistical package Stata 12.0 (Statacorp, 2011).

Results

Estimates of Health Expectancy

Table 1 begins with the absolute numbers and proportions of those who, from 1994 to 2009, reported self-rated good health, no health problems, and no school or work days missed

due to illness in the last 30 days before the survey. The health status of Russians varies considerably by indicator. The proportions of people who reported self-rated good health is much lower than those without health problems or without disability for each RLMS-HSE wave. Approximately 90 percent of the respondents reported the absence of disability throughout the study period, while less than 50 percent of people had self-rated good health. Women consistently have much worse self-rated health than men.

[Table 1, about here]

The results of the prevalence-based Sullivan method are presented in Table 2. To determine whether Russians are enjoying both longer and healthier lives, I first direct attention to the expected duration of life between ages 15 and 54. During the study period, partial life expectancy between ages 15 and 54 steadily improved among men and women. Men experienced a 1.3-year increase (from 35.0 years in 1994 to 36.3 years in 2009), and women enjoyed a 2.3-year increase (from 36.5 years in 1994 to 38.8 years in 2009). The results exhibit some fluctuations during the study period, but there are clear upward trends in partial life expectancy between ages 15 and 54 for both genders.

Next, I focus on the results of three health expectancy measures. Importantly, health-related quality of life, measured by HLE, MFLE, and DFLE, has also improved over the past two decades. There were increases in each indicator during the 1990s, followed by slight declines toward the end of the 1990s and early 2000s. Yet, each health expectancy measure continued to improve throughout the 2000s. Female HLE marked the largest improvement between 2000 and 2009, changing from 11.9 years to 14.5 years. Two additional points are worth noting. First, the results of health expectancy exhibit large differences by indicator. Between 1994 and 2009, DFLE had the best outcome, followed by MFLE and HLE. In 2008, for instance, the difference

between DFLE and HLE amounted to 17.4 years among men and 21.4 years among women. These results indicate that, for the period of 1994-2009, men and women in Russia spent the majority of their lives between ages 15 and 54 in an unhealthy state (53.2 percent of partial life expectancy for men and 63.7 percent for women), but they were, in fact, less likely to have health problems, or to be absent from work or school due to illness. These results illustrate a large variation of health-related quality of life by health status indicator, suggesting that health involves multiple dimensions. Second, I find clear gender differences in all health expectancy measures. In 2009, for example, Russian men spent 17.0 years between ages 15 and 54 in good health (46.8 percent of their partial life expectancy), whereas female HLE was 14.5 years (37.4 percent), amounting to a difference of 2.5 years of healthy life. Similar patterns were shared by MFLE (a 1.3-year difference) and DFLE (a 2.2-year difference). Across all years and all indicators, working-age females consistently exhibit lower levels of health expectancy compared to their male counterparts. These results are consistent with past research findings: women in Russia live longer lives but have worse health status than men (Hinote, Cockerhma, and Abbott, 2009).

Further, in order to determine the extent to which health-related quality of life among Russians has changed over the past two decades, I estimate regression models using health expectancy measures as the dependent variables and survey years as the independent variable. Table 3 presents the coefficients of annual change in HLE, MFLE, and DFLE. All three measures of health expectancy demonstrate significant changes between 1994 and 2009 at at least the .05 level, except for female DFLE. For instance, a one-year change in the survey year is associated with a .09-year increase in male HLE, and a .25-year increase in female HLE. Taken

as a whole, these findings offer evidence suggesting substantial improvements in health expectancy measures among working-age Russians throughout the post-Soviet period.

[Table 2 and 3, about here]

Macroeconomic Indicators and Health Expectancy

Table 4 summarizes the variables used in the analysis. Macroeconomic conditions worsened toward the end of the 1990s, characterized by declines in GDP per capita and increases in unemployment rates and inflation rates, due to the financial crisis of August 1998. The results during the 2000 are slightly better than those during the 1990s. Next, I investigate how these macroeconomic factors are related to the health status of the population. As shown in Table 5, there are strong associations between macroeconomic indicators and health expectancy. Between 1994 and 2009, a one-unit increase in GDP per capita is associated with a 1.26-year increase in HLE, a 2.31-year increase in MFLE, and a 1.48-year increase in DFLE among men. Same patterns are shared by women as well, and the results are significant at the .001 level, with the exception of the relationship between unemployment rates and female DFLE. In fact, the estimated coefficients of all the independent variables are in the expected direction. The expansion of per-person GDP has a positive relationship with HLE, IFLE, and DFLE, while a rise in unemployment rates and inflation rates is inversely associated with the health status of the working-age population. The findings here suggest that improvements in macroeconomic conditions, including increases in GDP and reductions in unemployment and inflation rates, might yield beneficial health consequences to men and women in Russia.

[Tables 4 and 5, about here]

Discussion

Summary of Findings

A key question motivating this research is whether adult-age Russians are now living both longer and healthier lives. The present results offer clear evidence that increases in life expectancy between ages 15 and 54 concur with improvements in the health status of the working-age population throughout the post-Soviet period. Between 1994 and 2009, the expected length of life between ages 15 and 54 rose by more than a year for both genders. Importantly, men and women also experienced significant increases in the expected duration of life spent in good health, without health problems, and without disability. These results suggest substantial improvements in the population's overall health status during the post-Soviet period, thereby offering evidence to suggest the compression of morbidity hypothesis among Russians at adult ages.

Further, the levels of health expectancy greatly vary by measurement. On the one hand, Russian men and women spend fewer years in a healthy state, but they are indeed less likely to experience health problems or miss work or school due to illness. While most studies tend to use a single health indicator and compute health expectancy, this research utilizes three different indicators of health – self-rated health, morbidity, and disability –, and uncovers how health-related quality of life varies by definition of health. These findings underscore the importance of employing multiple health indicators in computations of health expectancy, as health has various dimensions. Additionally, there are large gender differences in health expectancy measures. Although women live longer lives, they are burdened with worse physical health status compared to men. Due to the fact that mortality rates among Russian men are so high, limited attention has been paid to women's health (Hinote, Cockerham, and Abbott, 2009). Overall, more research on women' health in contemporary Russia is warranted.

Another intriguing finding of the current study is a strong association between macroeconomic factors and health expectancy measures. While the literatures on the post-Soviet economic devastation and the mortality crisis of the 1990s remain largely separate, this research is the first to numerically test their relationships. Regression analyses demonstrate that GDP per capita, unemployment rates, and inflation rates are closely associated with health-related quality of life among middle-aged Russians. Favorable economic trends, characterized by an increase in per-person GDP, are positively related to health expectancy, whereas declines in economic conditions, including a rise in unemployment and inflation rates, are characterized by lower levels of health expectancy. In fact, the state of macroeconomy might be linked to population health status in various ways. Economic growth, for instance, is likely to increase a nation's wealth, improve overall standards of living, such as better hygiene, greater food availability, and progress in medical care system, and produce beneficial health consequences to populations. There is indeed a great deal of research on the favorable influences of macroeconomic factors on health at the population level (Brainerd, 2001; Ram, 2006; Wilkinson, 1992). The deterioration in economic conditions, in contrast, might negatively impact the well-being of populations through diminishing health-promoting resources and inducing health-damaging behaviors. Some studies find that Russians resorted to alcohol to cope with stress stemming from repeated socioeconomic crises during the 1990s (Abott and Wallace, 2007), indicating alcohol consumption as a major contributor to the post-Soviet mortality crisis (Cockerham, 2000; Leon and Chenet, 1997; Leon, Shkolnikov, and McKee, 2009; Shkolnikov, McKee, and Leon, 2001). The present study contributes to the existing literature in this area by suggesting strong relationships between the country's economic well-being and health expectancy.

Limitations

This study's strengths include the use of large nationally-representative data, a focus on multiple dimensions of health, and an investigation of the macro-level correlates of the health status of working-age Russians. Readers, however, should consider several limitations when interpreting these results. The first limitation involves the study sample. The RLMS-HSE includes only non-institutionalized individuals, and thus those who reside in institutions, including homes for the aged, mental hospitals, and prisons, are excluded from the present analysis. Insitutionalized individuals indeed comprise small proportions of the Russian population. In 2008, only .18 percent of the population resided in special care institutions for the elderly and disabled (Federal State Statistics Service of the Russian Federation, 2010). Altough institutionalized persons are small in number, they nevertheless influence compations of health expectancy. As a consequence, computations of health expectancy measures in this research might be overestimated, since they are based on the assumptions that both institutionalized and non-institutionalized individuals have identical distributions of health conditions.

The second limitation of this research has to do with health indicators used in the analysis. Self-rated health, for example, has strengths as well as weaknesses. It is a fundamental indicator of overall health status and is widely used in social surveys. Importantly, self-rated health is a strong predictor of subsequent health problems as well as mortality risks, even when socio-demographic factors are well accounted for (Idler and Angel, 1990; Idler and Benyamini, 1997). This measurement, however, is influenced by cultural, situational and individual factors, such as age, gender, knowledge of specific diseases and illnesses, and language (for a comprehensive review, see Jylha, 2011). The subjective nature of self-rated health is especially problematic, when comparing results over an extend period of time. The levels of self-rated health may vary

over time, due to changes in expectations and standards of health. Therefore, the results of time trend analyses should be interpreted with caution.

The measures of morbidity and disability share weaknesses as well. Morbidity in the present study is measured by the experience of health problems in the last 30 days before the study. Yet, it is possible that health problems beyond the 30-day time-window remain underreported, while respondents with a long-standing illness may not regard his/her condition as an incidence of health problems. Similarly, disability in the current study is narrowly defined. Most studies use the information about ADLs or IADLS and define DFLE as the length of life spent without longstanding disability (Deeg, Verbrugge, and Jagger 2003; Jagger et al., 2008). The RLMS-HSE also includes questions about ADLs, but there are changes in question wording. Consequently, this study follows Verbrugge and Jette (1994)'s conceptual model of the disablement process and focuses on one's ability to go to work or school as a proxy for disability. Yet, people might go to work despite being ill due to concerns over job security. This is of particular importance for contemporary Russia where the labor market is increasingly becoming competitive. Thus, more objective measurement of disability is needed.

This study's results, together with its strengths and weaknesses, suggest some important directions for future research. First of all, it is important to note that the present findings do not indicate causal effects of macroeconomic indicators on health expectancy. Rather, they simply present how the state of macroeconomy is associated with health expectancy measures during the 1994-2009 period. In fact, debate continues regarding the influence of macroeconomic factors on population health. For instance, some studies suggest that the relationship between GDP and health becomes weak at the modern stage of development (Deaton, 2003; Preston, 1975), while others find a strong influence of GDP on life expectancy at birth and infant mortality rates (Ram,

2005; Wilkinson, 1992). Continued efforts toward identifying how macroeconomic indicators might be linked to health are needed. Also, although the current study utilizes publicly available data published by international organizations, given a large share of informal market and unofficial labor in Russian economy during the 1990s (Aslund, 2007), the extent to which macroeconomic conditions are related to health expectancy remains to be fully established. Extending this research beyond general macroeconomic factors will be an important direction for future research. Finally, the current study is based on the static prevalence rates of self-rated good health, health problems, and disability, and thus it cannot take changing health states into account. Future research could advance the present findings by obtaining the transition rates from one state, such as healthy, to another and computing incidence-based healthy life expectancy.

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Table 1. Distribution of Self-Rated Good Health, No Health Problems in the Last 30 Days, and No Absence from Work/School due to Illness in the Last 30 days, between Ages 15 and 54, RLMS-HSE, 1994-2009.

	Self-rated good health		No health problems in the last 30 days		No absence from work/school due to illness in the last 30 days	
	Number	%	Number	%	Number	%
Male						
1994	1,235	43.7	1,985	69.5	2,589	90.3
1995	1,296	48.8	1,973	74.2	2,525	93.5
1996	1,253	48.3	1,948	74.3	2,426	92.3
1998	1,312	48.1	2,102	76.0	2,567	92.5
2000	1,306	44.7	2,128	72.6	2,669	91.6
2001	1,485	45.2	2,295	70.6	2,972	91.8
2002	1,562	45.3	2,442	70.8	3,143	92.0
2003	1,593	45.4	2,584	72.8	3,228	91.8
2004	1,678	48.3	2,615	73.5	3,260	92.3
2005	1,718	50.2	2,610	76.7	3,217	93.4
2006	1,944	47.8	3,090	75.3	3,834	92.9
2007	1,997	50.2	3,083	77.5	3,806	94.8
2008	1,894	51.2	3,034	79.2	3,633	95.0
2009	1,810	47.2	2,953	78.3	3,566	94.8
Female						
1994	811	25.9	1,777	55.6	2,855	89.1
1995	963	32.2	1,923	63.6	2,727	90.5
1996	940	31.2	1,914	63.6	2,753	91.6
1998	977	30.8	2,072	64.2	2,958	92.3
2000	1,073	30.9	2,113	61.1	3,155	91.5
2001	1,132	29.3	2,350	60.7	3,508	90.5
2002	1,230	31.0	2,487	62.5	3,645	91.0
2003	1,281	32.4	2,615	63.6	3,719	91.3
2004	1,377	35.5	2,559	64.4	3,767	92.6
2005	1,457	39.1	2,665	67.9	3,703	93.9
2006	1,594	35.1	3,132	65.9	4,434	92.7
2007	1,742	38.9	3,089	66.7	4,335	93.3
2008	1,725	38.7	3,143	69.9	4,248	93.7
2009	1,648	38.0	3,129	70.1	4,157	93.0

Table 2. Partial Life Expectancy (PLE), Healthy Life Expectancy (HLE), Morbidity-Free Life Expectancy (MFLE), Disability-Free Life Expectancy (DFLE), between Ages 15 and 54, RLMS-HSE, 1994-2009

	PLE	HLE			DFLE			DFLE		
		years	95% CI	%	years	95% CI	%	years	95% CI	%
Male										
1994	35.0	15.2	(14.2-16.2)	43.5	24.3	(23.5-25.0)	69.3	31.6	(31.1-32.0)	90.3
1995	35.1	17.1	(16.1-18.0)	48.7	25.9	(25.2-26.6)	73.9	32.8	(32.4-33.1)	93.5
1996	35.5	17.1	(16.1-18.1)	48.0	26.3	(25.6-27.0)	73.7	32.8	(32.4-33.2)	92.3
1998	36.0	17.2	(16.2-18.2)	47.8	27.4	(26.7-28.1)	73.7	33.4	(33.1-33.8)	92.8
2000	35.2	16.2	(15.2-17.1)	45.9	25.7	(25.0-26.4)	75.9	32.2	(31.8-32.6)	92.8
2001	35.3	16.4	(15.5-17.3)	46.5	25.1	(24.3-25.7)	72.7	32.3	(31.9-32.6)	91.4
2002	35.3	16.3	(15.4-17.2)	46.2	25.0	(24.4-25.6)	72.0	32.6	(32.3-32.9)	92.5
2003	35.2	16.3	(15.5-17.2)	46.4	25.7	(26.5-27.7)	74.0	32.5	(32.2-32.9)	92.5
2004	35.2	17.1	(16.3-18.0)	48.7	25.9	(25.4-26.5)	74.5	32.7	(32.4-33.0)	93.0
2005	35.1	17.7	(16.9-18.6)	50.5	27.1	(26.5-27.7)	76.1	32.8	(32.5-33.1)	93.5
2006	35.5	17.0	(16.2-17.8)	47.8	26.7	(26.2-27.3)	75.2	33.0	(32.8-33.3)	93.1
2007	35.8	17.9	(17.1-18.7)	50.0	27.8	(27.2-28.3)	76.3	33.8	(33.5-34.0)	94.3
2008	36.0	18.3	(17.5-19.1)	51.0	28.4	(27.9-28.9)	79.7	34.3	(34.0-34.5)	95.3
2009	36.3	17.0	(16.1-17.8)	46.8	28.4	(27.8-28.9)	78.3	34.4	(34.1-34.7)	94.8
Female										
1994	36.5	9.3	(8.1-10.4)	25.4	19.9	(19.0-20.8)	54.5	32.4	(32.0-32.9)	88.9
1995	38.6	12.3	(11.1-13.4)	31.9	24.4	(23.5-25.2)	63.3	34.9	(34.5-35.4)	90.6
1996	38.7	11.8	(10.6-13.0)	30.5	24.4	(23.5-25.3)	63.0	35.5	(35.1-35.9)	91.6
1998	38.8	12.0	(10.9-13.2)	31.0	24.9	(24.1-25.7)	64.1	35.9	(35.5-36.3)	92.5
2000	38.6	11.9	(10.8-12.9)	30.9	23.8	(23.0-224.6)	61.5	35.4	(35.0-35.8)	91.6
2001	38.6	11.6	(10.6-12.6)	30.0	23.7	(22.9-24.4)	61.3	34.9	(34.5-35.3)	91.6
2002	38.5	12.2	(11.2-13.2)	31.7	24.3	(23.6-25.0)	63.0	35.2	(34.9-35.6)	91.3
2003	38.5	12.7	(11.7-13.6)	32.9	24.6	(23.9-25.3)	64.0	35.3	(34.9-35.6)	91.5
2004	38.5	13.7	(12.7-14.6)	35.4	24.9	(24.2-25.6)	64.5	35.7	(35.4-36.0)	92.6
2005	38.5	15.0	(14.0-15.9)	38.9	26.1	(25.5-26.8)	67.9	36.1	(35.8-36.4)	93.9
2006	38.6	13.4	(12.5-14.8)	34.7	25.4	(24.7-26.0)	65.9	35.9	(35.6-36.2)	92.9

2007	38.7	14.8	(13.9-15.7)	38.3	25.7	(25.0-26.3)	66.4	36.0	(35.7-36.3)	93.1
2008	36.7	14.4	(13.6-15.2)	39.3	25.8	(25.2-26.4)	70.3	34.4	(34.1-34.7)	93.7
2009	38.8	14.5	(13.6-15.4)	37.4	27.1	(26.5-27.7)	69.9	35.9	(35.6-36.2)	92.6

Table 3. Changes in HLE, MFLE, and DFLE, between Ages 15 and 54, RLMS-HSE, 1994-2009.

	HLE	MFLE	DFLE
Male	.09*	.18**	.11**
Female	.25***	.25**	.10†

†p<.1 * p<.05 **p<.01 *** p<.001

Table 4. Description of Variables Used in the Analysis.

	GDP per capita [a]	Unemployment rates (%) [b]	Inflation rates (%) [c]
1994	6331.6	8.1	307.3
1995	6128.0	9.5	144.0
1996	5947.3	9.7	45.8
1998	5673.6	13.2	18.5
2000	7612.8	10.6	37.7
2001	7802.8	9.8	0.3
2002	8247.9	8.9	15.5
2003	9186.1	7.8	13.8
2004	10543.2	7.9	20.3
2005	12214.9	7.2	19.3
2006	13957.0	7.2	15.2
2007	15719.2	6.1	13.8
2008	17959.6	6.3	18.0
2009	15714.2	8.4	2.0

a: Purchasing-power parity (PPP) converted GDP per capita at current prices in international dollars (Penn World Table Version 7.1).
b: A share of the unemployed of age-specific group in the total number of economically active population of the respective age group, in percentage (Federal Statistical Service of the Russian Federation).
c: Annual inflation rate in percentage (World Bank).

Table 5. Regression Analyses Assessing Bivariate Associations between Various Health Expectancies between Ages 15 and 54 and Macroeconomic Indicators, 1994-2009.

	HLE	MFLE	DFLE
Male			
GDP (ln/1,000)	1.26***	2.31***	1.48***
Unemployment rate (%)	-.18**	-.23***	-.16***
Inflation rate (ln)	-.26**	-.70***	-.48***
Female			
GDP (ln/1,000)	3.3***	2.63***	.53***
Unemployment rate (%)	-.50***	-.25***	.02
Inflation rate (ln)	-.92***	-1.10***	-.49***

*p<.05 **p<.01 *** p<.001