Impact of Retirement on Health in Russia

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Objectives

The official retirement age in Russia is one of the lowest in Europe (ILO, 2014). The official retirement age is 60 years for male workers and 55 years for female workers. These thresholds have not changed since 1930s. As of 2014, eleven of 15 ex-USSR countries have increased official retirement age since the collapse of the USSR (ILO, 2014). Numerous attempts to increase this age have occurred during past twenty years in Russia. Such increase could reduce the substantial deficit of the Pension Fund of the Russian Federation. However, opponents of the increase insist that retirement age increase could deepen the problem of the poor health of the elderly population. They point out the remarkably low life expectancy in Russia. In 2012, Russia with life expectancy at birth of 69 years ranked 124th place among all countries. The life expectancy for males is especially low and equals 63 years. But it is unclear whether the increase in the official retirement age would lead to a decline in health and what in such case would be the magnitude of the decline. Thus, estimation of the effect of retirement on health could provide useful information for the debates about official retirement age.

Practical contribution of research

This study will use the nationally representative data for Russian population so it could provide the representative estimates of retirement effects. These results could be useful for future public pension reforms in Russia. Previous reforms did not help to provide the sustainability of the Pension Fund. Therefore the possibility of retirement age increase is widely discussed. The information of impact of retirement on health is necessary to evaluate possible health decline due to changes of retirement age.

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2 The life expectancy at age 60 is 14 years for males and 20 years for females. Source of data: World Health Organization.
Literature review

The theoretical models predict that retirement could cause a decline in health as well as an improvement of health. The model of Grossman (2000) studies the health as both investment and consumption good. If the health is considered as an investment good than the retirement would lead to the decline in the health investment due to decline in the economic return to health. On the contrary, if the health is considered as a consumption good than the retirement would lead to the increase in the health investment due to increase in the spare time. Thus, the net effect is ambiguous.

There are also other theories which exploit other channels of retirement effect on health. For example, retirement could lead to mental problems, losses of social capital, and so on. But it could also lead to new social contacts, increase in time for leisure (De Grip et al, 2012; Rohwedder and Willis, 2010; Sahlgren, 2012).

The empirical estimates of the retirement effect using OLS often show that retirement causes the substantial decline in health. The main problem of such estimates is an endogeneity of the retirement: a person could retire due to anticipated health problems. Moreover, the decision of the retirement could be caused by non-observed factors which could also affect health in future. In such situation using OLS regression lead to biased estimates (Neuman, 2008).

Different methods are applied to deal with the endogeneity. For example, Dave et al. (2008) apply fixed effects estimation using US panel data. This model also shows the negative effect of retirement on health but the size of this effect is smaller than in the pooled OLS model. Another solution to the endogeneity problem is the regression discontinuity design. Such method is used by Eibich (2014) who discover the positive effects of retirement on health. Behncke (2012) uses propensity score matching estimation.

The most popular tool to deal with endogeneity bias is instrumental variable (IV) estimation. The IV variables include the spouse’s retirement status (Dave et al, 2008; Sahlgren, 2012), spouses’s age (Sahlgren, 2012), normal retirement age (Behncke, 2012; Coe and Zamaro, 2011), self-reported probabilities of working after retirement age (Insler, 2014). Positive effects of retirement on health with IV estimates are found in the United States (Neuman, 2008; Insler, 2014), Europe (Coe and Zamaro, 2011). On the other hand, negative effects of retirement on health using IV estimates are revealed in
China (Lei et al, 2011), Europe (Sahlgren, 2012), the United States (Dave et al., 2008), England (Behncke, 2012). It seems that differences in the effect direction are caused not only by country-related differences but also by the different instruments. For example, Coe and Zamaro (2011) and Sahlgren (2012) use the same survey data for 11 European countries but present opposite conclusions.

Thus, empirical literature provides ambiguous results. Some studies show positive effects of retirement on health while other studies show negative effects of retirement on health. The results also provide the possible sensitivity of results to the choice of the methodology.

To my best knowledge, the effect of retirement on health in Russia has never been investigated before. The closest work is Sinyavskaya (2005) which provides simulations for an impact of possible increase in the official retirement age on disability ratio using cross-sectional nationally representative NOBUS data. Some studies of retirement in Russia provide useful information for this study. Jensen and Richter (2004) show the strong effect of public pension delays on the health and reveal that such delays cause the return to labor market. Рощина (2008) shows that bad habits and sport activities are significant determinants of health. Kolev and Pascal (2002) find that health problems are among the main determinants of probability to work after retirement age. Кузьмин and Рощин (2007) show that labor market participation depends on health. Ляшок and Рощин (2012) reveal the effects of current health and health dynamics on labor supply. Абазиева (2009) shows that the health largely influences on the choice of labor market participation after the official retirement age. Козырева et al. (2013) show that the positive dynamics of health in 2000s is not observed for the old inhabitants. Черкашина (2011) reveals the wide range of retirement trajectories including the high probability of labor market exit before the official retirement age.

**Institutional features**

Empirical literature provides significant cross-country differences in timing of retirement. These differences are largely explained by variation in public policy (Rohwedder, Willis, 2010). Thus, it is important to exploit institutional features of pension system in Russia.

The official retirement age for most employees is 60 years for males and 55 years for females. These thresholds were established in 1932 and have never changed (Синявская, 2011). However, some
categories of employees are eligible for early retirement\textsuperscript{3}. As a result, the mean age of retirement is 3–5 years below the main official threshold (Малева, Синявская, 2005).

There are several types of public pensions: old age labor pension, disability labor pension, and survivor’s labor pension. Those eligible for the two or more types of public pension should choose one of them. The necessary requirement of old age labor pension is five years or more of labor market experience.

Methodology

a) Data

The source of data is the Russia Longitudinal Monitoring Survey (RLMS-HSE).\textsuperscript{4} This is a nationally representative panel household survey conducted every year. The households come from 32 different regions and all federal districts in Russia. This paper uses the panel part of the sample for Rounds 13 through 22 covering the years 2004 to 2013. Household and individual data are merged into one sample. The number of individuals involved in this survey is about 10,000 for Rounds 13-18 and about 18,000 for Rounds 19-22.

The survey data contains numerous questions about the individual health. The main dependent variable is the self-evaluation of health. The corresponding question is “\textit{How would you evaluate your health? It is:}"

\begin{itemize}
  \item 1 - very good,
  \item 2 - good,
  \item 3 - average - not good, but not bad,
  \item 4 - bad,
  \item 5 - very bad."
\end{itemize}

\textsuperscript{3} The last change of early retirement categories occurred in 1992.

To construct the dependent variable the initial scale is inverted so that larger values represent better health. The rationale for this is to provide a comparison with alternative health indicators which are discussed later in the section “Robustness check”.

The retirement in this project is defined as the permanent labor market exit after the age of 50. Thus, the database includes females and males aged 50-75. The individuals with labor market experience fewer than the five years are excluded from the sample. The RLMS data provide information about the month and year of leaving the last place of work, and interview date. This allows to determine the duration of the retirement.

b) Estimation

All models are estimated separately for females and males. The primary approach contains an estimation of two equations:

\[
\Delta H_{it} = \alpha + \gamma R_{it} + X_{it}' \beta + \varepsilon_{it},
\]

\[
R_{it} = \varphi + \theta IV_{it} + X_{it}' \pi + u_{it},
\]

where \(\Delta H_{it}\) is a change of the health indicator of individual \(i\) in year \(t\) compared with year \(t-1\); \(R_{it}\) is a dummy equal to 1 if an individual has retired between 12 and 24 months prior to interview date, and zero for working individuals; \(X_{it}\) is a vector of control variables; \(IV_{it}\) is an instrumental variable; \(\varepsilon_{it}\) and \(u_{it}\) are error terms; \(i\) denotes individual, and \(t\) denotes year. Control variables include age, cohort dummies, adjusted years of education, dummy for marital status, number of children in household, number of adults in household, and location dummies.

Using OLS for an estimation of the parameters of model (1) is likely to provide biased estimates due to the correlation between the variable of interest \(R_{it}\) and the error term \(\varepsilon_{it}\). This error term could include unobserved characteristics of an individual which are correlated with both health dynamics and retirement\(^5\). Moreover it is hard to predict the direction of the bias.

The primary tool in this project to deal with the endogeneity bias is the instrumental variables (IV) method. The estimates are obtained by the two stage least squares approach. In the first stage the model (2) is estimated where the variable \(R_{it}\) is a function of an IV variable. In the

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\(^5\) There is also a reverse causality where health affects retirement. The causal effect of health on retirement was demonstrated in numerous empirical studies for Russia (Кузьмич, Рощин, 2007; Абазиева, 2009; Ляшка, Рощин, 2012) and for other countries (McGarry, 2004).
second stage the model (1) is estimated. Models (1) and (2) have the same list of control variables.

The choice of an instrumental variable is crucial for this project. Two different instrumental variables are considered:

1) \textit{IV1} – the eligibility of old age labor pension\footnote{It is empirically confirmed that an eligibility of social security benefits largely influences the time of the retirement (French, 2005; French, Jones, 2011).}. Though the most common labor pension age is 55 for females and 60 for males, it is varied for the broad range of occupations and industries. \textit{IV1} is a dummy equal to 1 if an individual is eligible for old age labor pension, and zero otherwise.

2) \textit{IV2} – retirement expectations after the labor pension age\footnote{Insler (2014) used information of retirement expectations to construct an IV for identification the causal effect of retirement on health using data for the US.}. From Round 12 until Round 20, an individual was asked about her expected sources of income after the labor pension age. \textit{IV2} is a dummy equal to 1 if an individual in previous waves of RLMS-HSE expected obtaining labor income after her labor pension age, and zero if an individual in previous waves of RLMS-HSE did not expect obtaining labor income after her labor pension age. If there are several answers to this question in different waves than the earlier data are used to minimize the possibility of anticipating future health problems.

The problem of weak instruments is checked by the first-stage F-statistics using a critical value of 10 (Staiger, Stock, 1997). The identification of causal effects using these instrumental variables relies on the strong assumptions. The potential drawbacks of these variables are discussed in section “Robustness checks”.

c) Robustness checks

There are several potential threats to the identification strategy described in previous section. They include measurement errors, attrition bias, and the endogeneity of instrumental variables. This section discusses these problems and suggests possible robustness checks.

\textit{Measurement error}

Measurement error occurs if an individual gives the wrong information about her health. The common problem in health economics is so-called “justification bias”. An individual understates her health to justify the retirement. There is some evidence that the problem of justification bias is not so wide-spread in Russia (Ляшок, Рощин, 2012). However, this project
also uses alternative health indices which use additional “objective” information about the health. These indices aggregate the following variables:

1) self-evaluation of health,
2) dummy for heart disease, myocardial infarction,
3) dummy for high arterial blood pressure,
4) dummy for stroke--blood hemorrhage in the brain,
5) dummy for diabetes,
6) dummy for lung disease, bronchus,
7) dummy for liver disease,
8) dummy for kidney disease,
9) dummy for gastrointestinal disease,
10) dummy for spinal problems,
11) dummy for other chronic illness.

The first index is constructed using the principal component analysis method. This method is used to transform several correlated variables into a single measure. This measure is the first principle component which explains the largest share of the total variation of all variables (Lindelow, 2006).

The second index is constructed using the method suggested by Insler (2014) by four stages:

- First, eleven probit models including only eleven health variables are estimated separately. In each model dependent variable changes and all other variables become independent. For the self-evaluation of health the ordered probit model is used.
- Second, the predicted values of each dependent variable are calculated using the estimates of probit models.
- Third, each predicted values are normalized between zero and one, where the larger values indicate better health.
- Fourth, the mean of all normalized predicted values is calculated for each observation.

**Attrition bias**

This problem could arise due to selection effects in the next panel wave. The retired person with severe health problems has a higher probability to drop out of the sample than the retired healthy individual. A sick person could go to hospital, migrate to relatives, or even die. Ignoring such differences in sample selection could lead to biased estimates.

There are several ways to deal with attrition bias. First, the tests for attrition bias would be performed to check the presence of the correlation between poor health and attrition. Second, the
household questionnaire includes a question concerning the cause of person’s attrition. Such information could help to identify the causes attributed to health problems and correct health indicators. However, this method does not help in the case of single person in household. Third, probabilities for the staying in household would be calculated for different groups of individuals. These probabilities will provide the weights for the following analysis.

Endogeneity of instrumental variables

The assumptions of applying instruments IV1 or IV2 to obtain causal effects are rather strong. The first instrument, the eligibility of old age labor pension, assumes that health changes are not correlated with the eligibility for early labor pension. However, such pension is often provided for those who work in poor working conditions. Such conditions could substantially influence the health after retirement.

The second instrument, retirement expectations after the labor pension age, assumes that the person could not predict significant health decline in future. This could be true for sudden health problems. But a person could be aware of some inherited diseases, for example, which could occur in future.

Thus, alternative instruments will be considered. They include the presence of grandchildren in household, the ratio between old age labor pension and wage, working place characteristics, labor market participation of other household members, and presence of dacha (the wide-spread second house which often requires substantial efforts for gardening).

The different identification strategy uses the regression discontinuity (RD) design approach. Such approach utilizes the large increase in retirement probability after official retirement age. The same approach was used by Eibich (2014) to investigate the retirement effects on health in Germany.

Other robustness checks

Some other robustness checks are useful to obtain the reliable results. It is reasonable to split the sample by individuals with poor health and better health before retirement. Such procedure allows to check for the heterogeneity of effects. Different definitions of retirement could also be considered. For example, it is a common practice for many individuals in Russia to switch from full-time jobs to part-time jobs after labor pension age. Thus, it is useful to compare health changes of this group of employees with employees who keep full-time jobs.
d) Expected research output

The expected research output is an estimation of retirement effects on health indicators. Some preliminary results based on the data for 2006–2012 are presented in table 1. The dependent variable is the second health index. The results show statistically significant health improving effects of retirement for males and statistically insignificant health improving effects for females.

Table 1. The effect of retirement on health

<table>
<thead>
<tr>
<th></th>
<th>Females</th>
<th>Males</th>
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<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>IV1</td>
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<tr>
<td>( R_{it} )</td>
<td>-0.000</td>
<td>0.036*</td>
</tr>
<tr>
<td>Controls</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Number of individuals</td>
<td>6,635</td>
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</table>

Notes: robust standard errors are in parentheses,

\( * \) Significant at the 5 percent level; \( ** \) significant at the 10 percent level.

Bibliography


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There are no additional sources of funding for this project.
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<th>Time Period</th>
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<tr>
<td>January-February 2015</td>
<td>Extension of the theoretical background and literature review.</td>
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<tr>
<td></td>
<td>Creation of the main database including RLMS data from 2003 to 2013.</td>
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<tr>
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<td>Preparation the sample. Descriptive statistics.</td>
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<tr>
<td>March 2015</td>
<td>Econometric investigation of the retirement effects on health. Testing</td>
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<tr>
<td>April 2015</td>
<td>Checking the alternative health indicators.</td>
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<tr>
<td>May-June 2015</td>
<td>Investigation and correction for panel attrition bias. Preparation of the</td>
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<td>July 2015</td>
<td>Checking for other possible instruments.</td>
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<tr>
<td>August-September 2015</td>
<td>Application of the regression discontinuity design approach</td>
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<td>October-December 2015</td>
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