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## **WHAT HAPPENS TO HAPPINESS WHEN PEOPLE GET OLDER? SOCIO-ECONOMIC DETERMINANTS OF LIFE SATISFACTION IN LATER LIFE<sup>4</sup>**

The world population is ageing and this demographic trend has become the subject of numerous research projects and discussions. In Russia, this process has also become a topic for many studies examining socio-economic characteristics and health status of elderly, their retirement behaviours. That said, research on the life satisfaction of Russian seniors and its determinants is still rather scarce. At the same time, revealing the factors of life satisfaction in old age could help develop a sound state policy towards the elderly thus enhancing the well-being of society as a whole.

This paper explores the determinants of elderly life satisfaction using micro-data from the Russian Longitudinal Monitoring Survey. Our research show that for all Russian seniors aged 55+ the strongest and most common predictors of life satisfaction are: health status, personal income, type of settlement, and social status. We found significant gender differences in factors of life satisfaction: an inverse U-relation of age and happiness is characteristic for the oldest old females only; holding a job enhances life satisfaction for women but not for men; and the education level of seniors has almost no correlation with life satisfaction, while having children decreases an individual's happiness.

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## 1. Introduction

In most rich countries of the world the population is ageing. This tendency becomes more and more evident in developing countries. According to the UN World Population Prospects, in developed countries the number of people aged 60 or over is expected to rise from 287 million in 2013 to 417 million in 2050. In less developed countries the same figures are 554 million and 1.6 billion, respectively. By the middle of the century the share of elderly will reach 32% of the whole population in rich countries and 19% in developing countries (UN, 2013, p. xxvii-xxviii). Statistical data on the Russian population shows that while the share of elderly aged 60 and over is currently about 19%, according to the Federal State Statistical Service (Rosstat) and the UN, it could reach 24% by 2030, thus placing Russia in a pool of countries with very high level of population maturity (Rosstat, 2013a; Rosstat, 2013b; Vishnevskiy, 2012).

Since its detection in the early 1990s, this demographic trend has become the subject of numerous research projects and discussions among scientists, and later policymakers. Population ageing is a serious problem or set of problems faced by modern societies. It starts with pension systems sustainability and health expenditure growth, but also extends to lower productivity and a shrinking labour force. However, much less attention is given to the possibilities of active ageing. Seniors could successfully participate in a social life, holding part-time or less demanding jobs, being volunteers, teaching children, contributing to local events or political campaigns and so on. In general, not only pensions and medical care make people active and happy in their prolonged older years. Research shows that successful ageing heavily depends on the so-called ‘subjective well-being’ (Baltes & Baltes, 1990; Freund & Baltes, 1998).

Some years ago *The Economist* published a piece called “The U-bend of Life” (2010). Based on a number of country studies, it argued that life satisfaction level, starting from a high point in youth, declines until a certain midlife minimum then increases again in later years. Richard Layard, a prominent British economist, in his comprehensive book “Happiness: Lessons from a New Science” suggests an explanation for this tendency (Layard, 2011). In particular, he notes that happiness is merely a discrepancy between people’s wants and actual achievements. Since desires decrease and achievements normally accumulate in the course of a lifetime, the discrepancy tends to be smaller among elderly. However, the research on individual life satisfaction based on micro-data does not necessarily support this idea.

In Russia, the process of population ageing has also become a topic for many studies examining socio-economic characteristics and health status of elderly, factors of their labour force participation and retirement behaviours (Bespalova & Roshchina, 2011; Gurvich & Sonina, 2012; Lyashok & Maltseva, 2012; Maleva & Sinyavskaya, 2008; Vishnevskiy et al., 2012). But

research on life satisfaction of Russian elderly and its determinants is rather scarce: just a few papers estimate happiness for the population as a whole (Aistov & Leonova, 2011; Andreenkova, 2010; Guriev & Zhuravskaya, 2007). At the same time, revealing the factors of life satisfaction in old age is not of academic interest only. It could help develop a sound and complex state policy towards the elderly, thus enhancing the well-being of an ageing society as a whole. As Layard points out, “if we want people to be happier, we really have to know what conditions generate happiness and how to cultivate them” (Layard, 2011, p. 4). The aim of this paper is to find out the determinants of happiness for Russian seniors.

To conduct an analysis of elderly life satisfaction, we start with the definitions of life satisfaction, subjective well-being and happiness (Section 2) and then continue with the measurement issues (Section 3). Section 4 provides a review of relevant literature. Our empirical research hypotheses and the data are presented in Section 5. The descriptive statistics and regression analysis results are described in Sections 6 and 7. The paper ends with a discussion and conclusions in Section 8.

## **2. Definitions**

In analysing life satisfaction and its determinants scholars often use different terms. Some of them prefer ‘*subjective well-being*’ (SWB) (Alexandrova, 2005; Pinqart & Sorensen, 2000), and others use a vague, less scientific term, ‘*happiness*’ (Angner et al., 2009; Chan & Lee, 2006; Easterlin, 2006; Graham, 2005; Layard, 2011; Li et al., 2012). In empirical research it is more common to use ‘*life satisfaction*’ (LS) (Borg et al., 2006; Gwozdz & Sousa-Poza, 2009; Pinto & Liberalesso, 2013; Zaidi et al., 2009). It is defined by Veenhoven (1996, p. 6) as the “degree to which a person positively evaluates the overall quality of his/her life as-a-whole”. Most of experts acknowledge, however, a certain correlation between all the notions mentioned. Thus, Myers and Diener regard life satisfaction as one of the subjective well-being components: “SWB is defined by three correlated but distinct factors: the relative presence of positive affect, absence of negative affect, and satisfaction with life” (Myers & Diener, 1995, p. 11). Many scholars consider these terms synonyms (De Neve & Oswald 2012; Veenhoven, 1996). In our research we also hold to this opinion and use the term ‘*life satisfaction*’ to characterize elderly well-being. As Veenhoven emphasizes, “the term ‘life-satisfaction’ has the advantage over the label of ‘subjective well-being’ in that life-satisfaction refers to an overall evaluation of life rather than to current feelings or to specific psychosomatic symptoms” (Veenhoven, 1996, p. 6).

### 3. Measurement issues

There are numerous ways to measure LS and its variation between people including representatives of different age groups. The most common are methods based on the Life Satisfaction Index (LSI) (Neugarten et al., 1961) and the Satisfaction with Life Scale (SWLS) (Diener et al., 1985). The first one is specifically aimed at estimating LS of senior age groups and includes 20 questions concerning different aspects of their day-to-day life. The second method is more universal and could be used for all age groups. According to SWLS, an individual's life satisfaction level is based on her attitudes to five statements concerning her subjective well-being (for example: "I am satisfied with my life", "If I could live my life over, I would change almost nothing"). A respondent could express some degree of agreement/disagreement choosing one of seven options from 1 to 7 – "strongly disagree" to 7 - "strongly agree", respectively. Lyubomirsky and Lepper (1999, p. 151) suggested an alternative method to measure happiness. Their Subjective Happiness Scale includes four statements on subjective well-being and seven possible options for each one (for example, the beginning of the statement is: "In general, I consider myself", and there are options to continue the sentence from 1 to 7 – "not a very a very happy person" to "a very happy person", respectively).

In practice gathering detailed information on a person's LS is quite difficult. That is why alongside the approaches mentioned above more simple methods are also being used. As Veenhoven notes, "life-satisfaction is commonly assessed by single direct questions within the context of a survey interview" (Veenhoven 1996, p. 7). Dolan et al. have reviewed 19 large-scale national and cross-national data sets, including measures of subjective well-being. Mostly they used "only a single, or sometimes two, single item measures" (Dolan et al., 2008, p. 97). For example, the British Household Panel Survey (BHPS) includes the question, "How satisfied are you with your life overall?" with possible answers from 1 to 7 – "Not satisfied at all" to "Completely satisfied" (Dolan et al., 2008).

To assess the life satisfaction level of Russian elderly, this study will also use just one related question of the Russian Longitudinal Monitoring Survey (RLMS-HSE)<sup>5</sup> with five alternative answers. The question is: "To what extent are you satisfied with your life in general at the present time?" and the answers are: 1) fully satisfied; 2) rather satisfied; 3) both yes and no; 4) less than satisfied; 5) not at all satisfied.

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<sup>5</sup> RLMS description see in Section 5.

## 4. Literature Review

Numerous research papers are devoted to life satisfaction in old age, its level and determinants. We summarize the results below according to the main factors of happiness often mentioned by scholars.

### 4.1 Age

The interrelation of age and happiness has been investigated quite intensively and in many countries. Still there is no unambiguous answer about whether increasing age enhances LS or not. Existing estimates differ depending on time period, country, sample, age groups, controlling variables, etc. Some authors argue that there is no consistent independent relation of age to well-being (Larson, 1978; Myers & Deiner, 1995). Others find a certain relation but admit that the correlation is small and depends on the component of SWB being measured (Deiner et al., 2009; Miller, 2013).

On the other hand, there is a growing amount of literature supporting the idea of happiness and age correlation. Fernandez and Kulik analyze the factors of SWB in the USA and conclude that, “older persons are significantly more satisfied than younger” (Fernandez & Kulik, 1981, p. 846). The review made by Dolan and co-authors focuses on papers investigating the relationship between age and LS (Dolan et al., 2008). They analyzed all the papers in the main economic journals and key reviews in psychology from 1990 and summarized the results: “Studies consistently find a negative relationship between age and SWB and a positive relationship between age squared and SWB. Studies suggest a U-shaped curve with higher levels of well-being at the younger and older age points and the lowest life satisfaction occurring in middle age, between about 32 and 50 years, depending on the study” (Dolan et al., 2008, p. 98).

At the same time, some studies reveal more complex dynamics of happiness in older years. In a sample of German adults, Gwozdz and Sousa-Poza reveal a U-shape relationship between age and LS for people between 16 and 65 years old. They note, however, a sharp decline in happiness level after 65: “life satisfaction declines rapidly and the lowest absolute levels of life satisfaction are recorded for the oldest old” (Gwozdz & Sousa-Poza, 2009, p. 3). A similar tendency was discovered for the elderly in Taiwan: “life satisfaction among the elderly decreased as age increased beyond 65 years of age” (Chen, 2001, p. 57). Edwards and Klemmack found a negative correlation between age and happiness for Americans aged 45 and older (Edwards & Klemmack, 1973).

One of the few studies based on longitudinal design is a work by Mroczek and Spiro (2005). They analyzed the dynamics of LS level in the same group of American men over 22 years of their lives and estimated a peak of happiness at 65 with a following decline. According

to the authors, “The findings are at odds with prior (cross-sectional) research showing that subjective well-being improves with aging” (Mroczek & Spiro, 2005, p. 189). Steptoe and co-authors estimated LS and age correlation for an elder English group and revealed an inverse U-relation with maximum LS between 70 and 79 for men and between 60 and 69 for women (Steptoe et al., 2012).

In one of the few studies based on Russian data, a statistically significant though not very strong positive correlation between LS and age was revealed (Andreenkova, 2010). The author found that LS gradually declines with age until 55-60, then increases to some extent and then decreases again after 70. The author admits however that the correlation mentioned becomes statistically insignificant when other determinants of LS (gender, education, income, etc.) are controlled for.

In a study by Aistov and Leonova (2011) various specifications of regression models were used to estimate the relationship between age and happiness of Russians. Using cross-sectional and panel data of RLMS and estimating a number of models (ordered probit, pooled logit, fixed-effect logit) the authors found conflicting results.

Guriev and Zhurazskaya (2007) compare LS response to ageing in two groups of countries – transition and non-transition economies. They conclude that controlling for education and employment status of individuals the same U-shaped curve can be observed in both groups of countries. The only difference is a point of minimal LS around 40-years-old in non-transition countries and around 60-years-old in transitional countries (Guriev & Zhuravskaya, 2007).

However, the U-shaped relationship between age and happiness reported in many studies does not necessarily show a true ageing effect, “it may simply be a cohort effect arising from unobserved individual heterogeneity” (Gwozdz & Sousa-Poza, 2009, p. 4). Most of the studies cited used cross-sectional data, thus comparing LS of young and elderly belonging to different age cohorts. As Easterlin puts it, “the conclusion of the economic studies – that the happiness-age relationship is U-shaped when many age-related differences in life circumstances are controlled – is, no doubt, of interest, but it is misleading to suggest that it says anything about how the happiness of young or old persons compares, on average, with those at midlife” (Easterlin, 2006, p. 465). Nonetheless there are some indications that, even after controlling for cohort effects, LS is U-shaped through a life-course (Blanchflower & Oswald, 2008).

## **4.2 Gender**

Gender itself is not a significant factor of LS variation among elderly (Larson, 1978; Wallace, 2008). However, calculations made for separate groups of men and women show some differences in determinants of SWB. Meggiolaro and Ongaro analyzed the survey results of

17,000 men and women aged 65+ and found that, “a high educational level is positively associated with life satisfaction only for men, whereas only for women do physical limitations decrease life satisfaction” (Meggiolaro & Ongaro, 2013, p. 11). Sheung-Tak and Chan (2006) discovered that social networking (communications with friends or acquaintances) has more influence upon female LS comparing to male. Wang and co-authors note that LS for men depends on social support, especially in later years of life: “According to the results of the multiple regression analyses, life satisfaction was related to mental health and age in females, while it was related to mental health status and social support from others in males” (Wang et al., 2002, p. 141). Gender differences in LS determinants were found also in a study by Takashi (2011), who points out that LS is more closely connected with family relations for women than for men. At the same time, “men become much more depressed than women following a divorce or widowhood” (Takashi, 2011, p. 1).

### **4.3 Type of settlement**

The research cited above also revealed the role of a type of settlement among other LS determinants. Specifically, inhabitants of megacities are less happy compared to those living in the country (Zaidi et al., 2009). Some empirical research investigated neighborhood impact on subjective well-being (Bramston et al., 2002; Fernandez & Kulik, 1981; Smith et al., 2004). Their results are contradictory. On the one hand, Fernandez and Kulik (1981) name a region of inhabitation as one of the important LS predictors based on a survey of 8000 US citizens. As well as Zaidi et al., they found greater life satisfaction among villagers than among those living in cities. Moreover, the authors stress the importance of an individual’s relative position: “...persons living in neighborhoods with a high cost of living are less satisfied. People whose incomes are below the neighborhood average may be less satisfied” (Fernandez & Kulik, 1981, p. 840).

Bramston and co-authors found a rather weak correlation between community attributes and a person’s subjective well-being “once loneliness has been accounted for” (Bramston et al., 2002, p. 261). One of the few research papers devoted specifically to neighborhood influence on elderly well-being investigated the situation in deprived area of three English cities. The authors found that “variables that described characteristics of the urban environment had limited direct influence on the quality of life” (Smith et al., 2004, p. 793).

#### **4.4 Health status**

Many scholars name self-rated health status as one of the main factors determining an individual's SWB in older age (Borg et al., 2006; Chen & Short, 2008; Larson, 1978). It is especially important for people with reduced functional capacity (Borg et al., 2006; Borg et al., 2008) and centenarians (Gwozdz & Sousa-Poza, 2009). A number of research papers report on strong to moderate positive correlation between elderly LS and subjective health measures. For example, a recent study conducted in Germany shows the correlation coefficient equal to 0.538 (for people 75-years-old and older); another one conducted in the USA reports the coefficient equal to 0.373 (for people aged 50-65) (Angner et al., 2009; Gwozdz & Sousa-Poza, 2009).

#### **4.5 Healthy behaviours**

There is little evidence on healthy behaviours and LS correlation among older people. However, some research has revealed a positive impact of physical activity on elderly subjective well-being (Fernandez et al., 2001; Wallace, 2008). McAuley and co-authors (2006) found a direct relationship between physical activity and quality of life. Kudo and co-authors emphasize habits for health promotion as determining morale scores of seniors (Kudo et al., 2007). Steptoe and co-authors (2012) found a positive correlation between smoking and depressive symptoms among people older than 50: "Here were large effects for depression, since substantially more current smokers reported elevated depressive symptoms (26%) than ex-smokers (13%) and those who never smoked (15%)." (Steptoe et al., 2012, p. 119). Franco et al. (2012) discovered a significant negative relationship between smoking and quality of life for males.

#### **4.6 Education**

The impact of education on seniors' happiness is questionable. Pinqart and Sørensen (2000) made a survey of 286 empirical studies on SWB of seniors and concluded that education has small though positive influence on well-being. Kudo et al. (2007) in their study of old Japanese, as well as Cid et al. (2007), analysing Uruguayans, got different results: "education has no clear impact on happiness" (Cid et al., 2007, p. 1). There are even some studies that show a lower level of education being associated with higher LS (Fernandez & Kulik, 1981).

#### **4.7 Income**

Unsurprisingly, many authors stress the positive influence of income on life satisfaction of seniors (Cid et al., 2007; Fernández-Ballesteros et al., 2001; Larson, 1978; Li et al., 2012; Revicki & Mitchell, 1990; Wallace, 2008). But some studies estimate the correlation as not so



strong. For example, Pinquart and Sørensen concluded that the association between income and happiness is quite small: “The strength of the relationship between these variables may be limited by the fact that older adults often adjust their needs and desires to their financial situation” (Pinquart & Sørensen, 2000, p. 197).

#### **4.8 Employment status**

All the specialists emphasize in unison the importance of employment status for elderly LS. However, the estimates of employment influence differ a lot. Many studies reveal a positive relationship between productive activities (full-time employment or volunteering) and self well-being of seniors (Hao, 2008; Morrow-Howell et al., 2003). On the other hand there is evidence of the opposite relationship. Thus, Wallace (2008) analyzing a survey of 793 elderly Americans found that “retired individuals received much higher physical component and mental component life satisfaction scores ... than did individuals who are not retired” (Wallace, 2008, p. 87).

#### **4.9 Social status**

Social status, defined as other people’s attitudes to an individual, is not often mentioned as one of the subjective well-being determinants. Normally, it is regarded as a part of professional status (Larson, 1978). However in a large-scale research project initiated by the World Bank, subjective social status was considered to be one of the factors influencing LS. The survey sample included about 1000 households in 29 countries of Eastern Europe and the former USSR. The variable of subjective social status was based on an individual’s statement: “I have done better in life than most of my high school classmates/colleagues I had around ten years ago” (Zaidi et al., 2009, p. 9). Research has show that a person’s position with respect to former colleagues or classmates relative to 1989 increases LS. The results were identical for all the countries and age groups (Zaidi et al., 2009).

#### **4.10 Family status**

Family status is an important determinant of LS among older people in Europe. Research shows that those married or living with a partner normally assess their well-being higher than single individuals (Buber & Engelhardt, 2008; De Jong Gierveld et al., 2012). But the single status itself could influence LS in different ways: “Being divorced, compared to being widowed, had a negative impact on life satisfaction, while being never-married was a positive factor” (Gaymu & Springer, 2010, p. 1163). The status of a family man could be more or less important depending on a county’s culture and traditions. Polverini and Lamura (2005) show that “in the more

familialistic societies of southern (and eastern) Europe, where intergenerational support is the norm and parents have strong expectations on adult children (and vice-versa), family relationships are the most important source of life satisfaction among older people” (Meggiolaro & Ongaro, 2013, p. 6).

Similar conclusions were made in research in Asian countries. Family relationships were an important factor influencing the happiness of elderly females in Taiwan (Nanthamongkolchai et al., 2009). Chen and Short, in their study on Chinese older adults, found that “co-residence with immediate family (spouse or children) is associated with positive subjective well-being” (Chen and Short, 2008, p. 1379). Takashi (2011) revealed a higher level of SWB among Japanese elderly living with a family. At the same time, he points out that divorce or widowhood reduces the level of LS, and the corresponding LS decline is more evident for men than for women. The same trend was also registered in other countries (Chipperfield & Havens, 2001; Lee et al., 2001).

#### **4.11 Children**

Various studies provide rather ambiguous results concerning the role of children (grandchildren) in seniors’ well-being (Buber & Engelhardt, 2008; Chyi & Mao, 2011; Gaymu & Springer, 2010). Obviously, it is important whether the children live with their parents in the same household, or not. Chyi and Mao found that “conditional on living with a grandchild, living with one’s child has a negative effect on the elderly’s happiness. Furthermore, elderly Chinese who live with grandchildren are associated with a much higher degree of happiness than their counterparts” (Chyi & Mao, 2011, p. 167). Meggiolaro & Ongaro (2013) found that for senior Italians, “physical closeness with adult children (in terms of co-residence or frequent contact) increases the life satisfaction of older men and women compared to those who do not have such closeness” (Meggiolaro & Ongaro, 2013, p. 6). A study of elderly Japanese shows that “regarding relations with children, co-residence with a son is negatively associated with life satisfaction for both men and women, while co-residence with a married son raises it substantially” (Takashi, 2011, p. 11).

For those living separately, the frequency of contact also matters. Again, a country’s culture and traditions should be taken into account (Polverini & Lamura, 2005). Gaymu and Springer (2010) revealed a positive association between the number of contacts with children and LS for women living alone in southern Europe. But for women living in other European countries, the same was not true. Similar results were present in research made by Buber and Engelhardt: “Little contact with children seems to affect the mental health of older mothers in different ways. Whereas older mothers in Sweden and Denmark reported rather few depressive

symptoms, those in Austria, Germany, The Netherlands, France, Greece, Switzerland and Belgium had more depressive symptoms. Having little contact with children was very rare in Italy and Spain (2–3%) and the corresponding coefficients indicated only slightly higher levels of depression” (Buber & Engelhardt, 2008, p. 39).

A number of studies support the hypothesis of Rosenmayr (1983) – “that quality of contacts with adult children, more than quantity, is important to the well-being of older adults” (Pinquart & Sørensen, 2000, p. 197).

The results of the literature survey are summarized in Appendix A.

## 5. Hypotheses and data

The literature survey presented above provides the basis for the hypotheses formulated and tested later in this paper. Since the LS determinants were mostly investigated in countries other than Russia, and some of the papers cited did not distinguish between specific age groups, it seems important to find out whether the same determinants influence the happiness of Russian elderly. We suppose that following **four groups of factors influence the life satisfaction level of seniors in Russia:**

H1: Personal characteristics;

H2: Health status and healthy behaviours;

H3: Socioeconomic characteristics;

H4: Family relationship.

In particular, we include in the first group such personal characteristics as *age*, *gender* and *type of settlement* (living in a city or in a country). We assume that age increases happiness in later life, but for the oldest old, LS declines again and there is a gender difference in LS level, other things being equal. We suppose also that life in a city decreases LS.

The second group consists of *health status* and *smoking status* indicators. We expect LS to be positively correlated with health status and negatively correlated with smoking.

Socioeconomic characteristics (third group) embrace an individual’s *education*, *income*, *employment status* and *social status*. We think that all these characteristics enhance the life satisfaction of elderly – the higher the status, income and education level, the higher the LS.

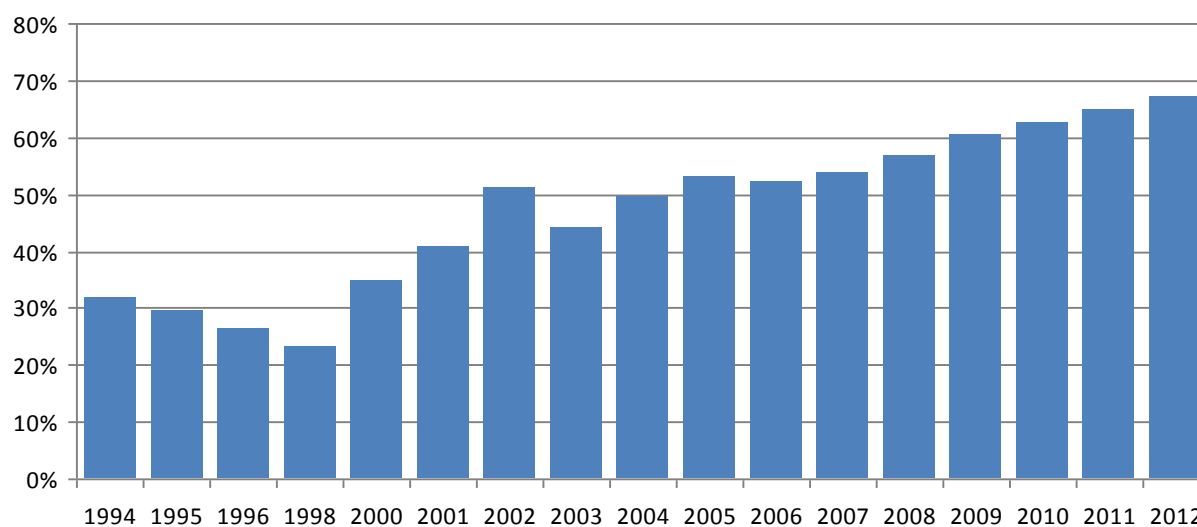
Finally, factors of family relationship include *marital status* and *children*. We assume that having a spouse (partner) and children positively influences the LS of elderly.

To test the hypotheses listed above we used micro-data provided by the Russian Longitudinal Monitoring Survey (RLMS-HSE), conducted by the Higher School of Economics and ZAO “Demoscope” together with the Carolina Population Center, University of North

Carolina at Chapel Hill, and the Institute of Sociology at the Russian Academy of Sciences (National Research University Higher School of Economics [HSE], 2013). The RLMS-HSE is a household-based, nationally representative survey, and its individual questionnaires collect rich information on respondents' well-being and other personal characteristics. We used individual panel data from rounds 18-21 of the RLMS-HSE (2009-2012), including in our sub-sample of only people aged 55 and older.<sup>6</sup> The total number of observations amounted to 5920 persons, 4020 women and 1900 men. We also used cross-sectional samples from various years for descriptive analysis.

## 6. Descriptive statistics

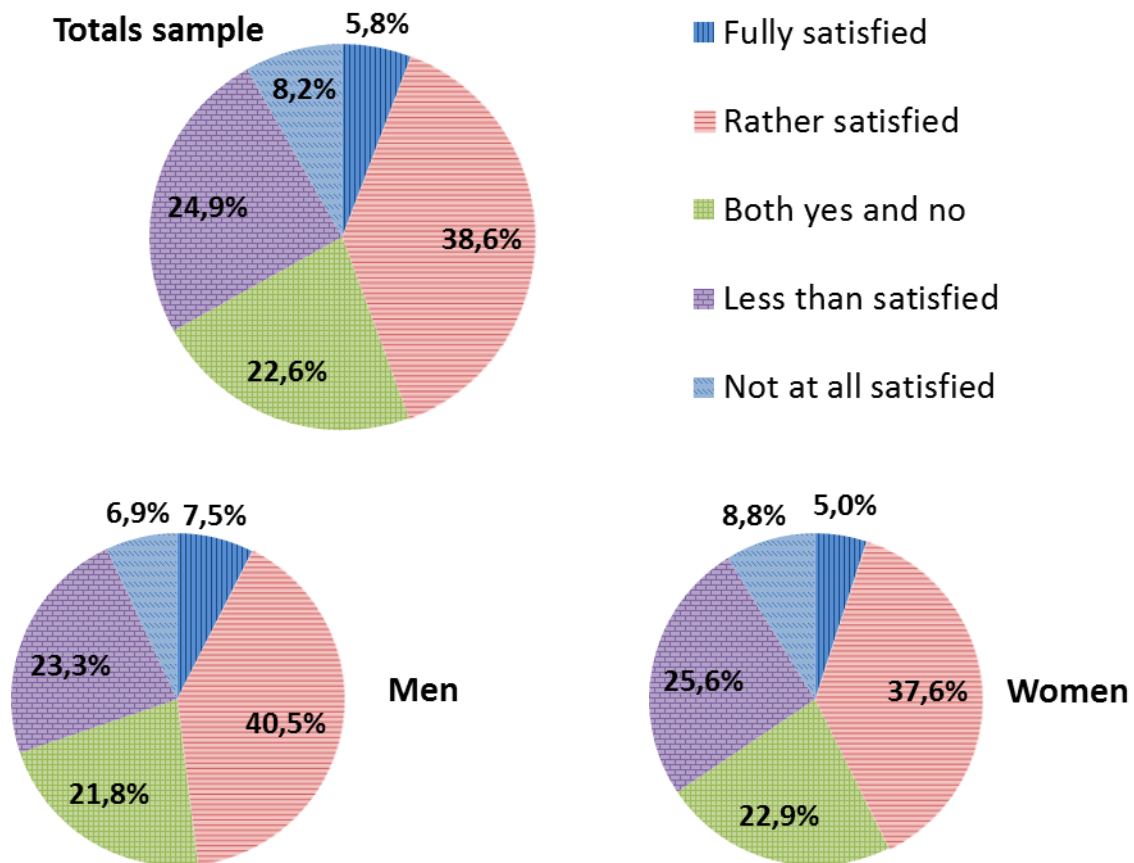
A number of questions from the RLMS-HSE individual questionnaire were used to estimate the exogenous factors presumably affecting the LS of elderly (some of them are presented in Appendix B). The LS level varies from 1 to 5 – “not at all satisfied” to “fully satisfied”. Among Russian seniors, the share of those moderately, rather or fully satisfied rose from 1994 to 2012 though non-monotonically. Figure 1, based on RLMS-HSE cross-sectional data, illustrates the percentages of those who chose the answers “3”, “4” or “5”.



**Figure 1. Percentage of seniors 55+ quite satisfied with their lives (answers “3”, “4” and “5”), RSMS-HSE cross-sectional samples, 1994-2012 (%).**

Figure 2, based on 2009-2012 panel data, shows that almost half of Russian elderly were fully or rather “satisfied with their life in general”. Women were less happy than men, on average.

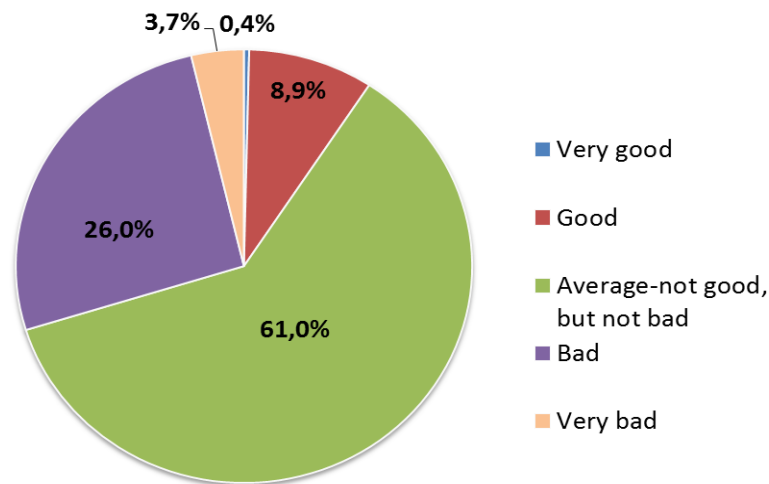
<sup>6</sup> In Russia official pension age is 55 for women and 60 for men. There are also numerous categories of workers with a legal right for early retirement (for example: miners, school teachers, those completed military or police service, airlines pilots, etc.).



**Figure 2. Life satisfaction level of Russian elderly, RLMS-HSE panel sample, 2009-2012 (%)**.

It is important to note that we used two different measures of health status in our analysis. The first was *self-rated health status*. We used a direct question with five possible answers, from “very good” to “very bad”. Thus a person judges her own health as she feels it at the moment of the interview. Figure 3 shows the distribution of answers among Russian seniors from 2009-2012. Most of them (61%) describe their health as “average”. Thirty percent say their health is bad or very bad, while only 9% consider it good or very good.

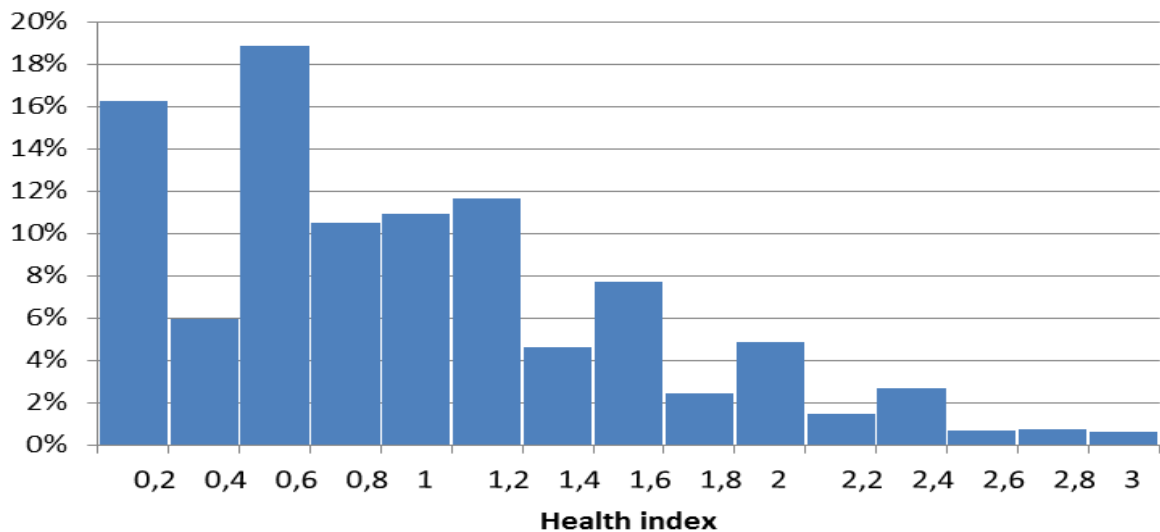
Another way to fairly estimate one’s health basing on RLMS-HSE data is to construct a *health index*. To do this, we combined a number of questions about various existing health problems, disability, high blood pressure, height and weight (to calculate a person’s body mass index – BMI). Thus we got nine “external” variables of a person’s health (Table 1). To reduce the dimensions of these data, a principal components method was applied. The health index fluctuates from 0 (no diseases included in principal components) to 2.86 (Fig. 4).



**Figure 3. Self-rated health status of elderly, RLMS-HSE panel sample, 2009-2012 (%).**

**Table 1. Descriptive statistics of ‘external’ health variables.**

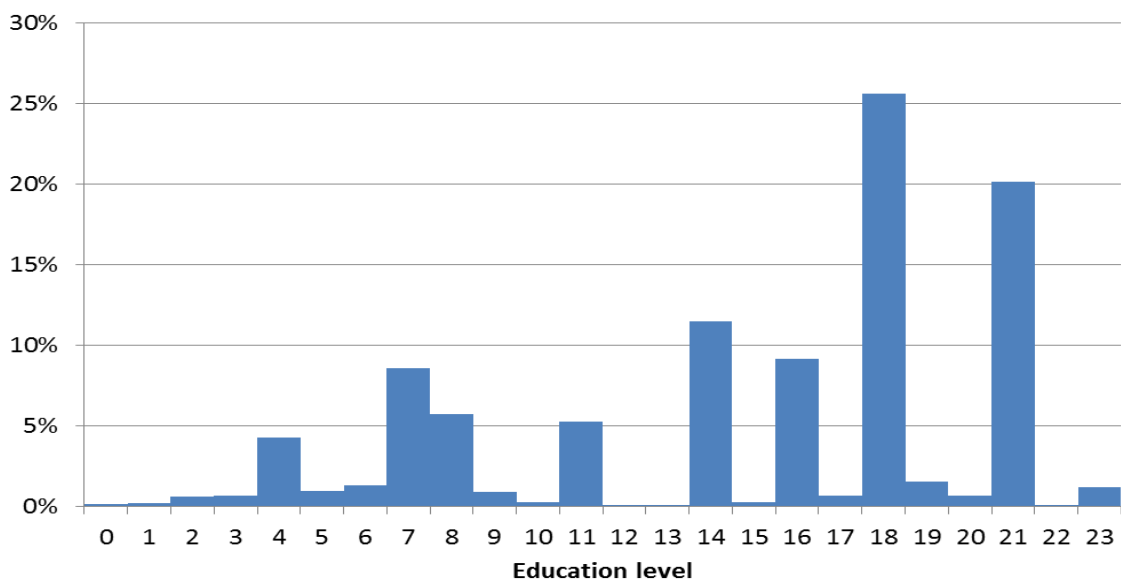
Variable	Mean	Standard deviation	Minimum	Maximum	Coefficients for health index construction
Heart disease (1 – yes, 0 - no)	0.38	0.49	0	1	0.41
Lung disease (1 – yes, 0 - no)	0.08	0.27	0	1	0.23
Liver disease (1 – yes, 0 - no)	0.17	0.37	0	1	0.42
Kidney disease (1 – yes, 0 - no)	0.15	0.35	0	1	0.38
Gastrointestinal disease (1 – yes, 0 no)	0.27	0.44	0	1	0.4
Spinal problems (1 – yes, 0 - no)	0.29	0.45	0	1	0.34
Disability (1 – yes, 0 - no)	0.23	0.42	0	1	0.26
Blood pressure (1- high, 0 - no)	0.7	0.46	0	1	0.31
BMI (1 – abnormal, 0 – normal)	0.75	0.43	0	1	0.09



**Figure 4. Health index distribution among seniors, RLMS-HSE panel sample, 2009-2012 (%)**.

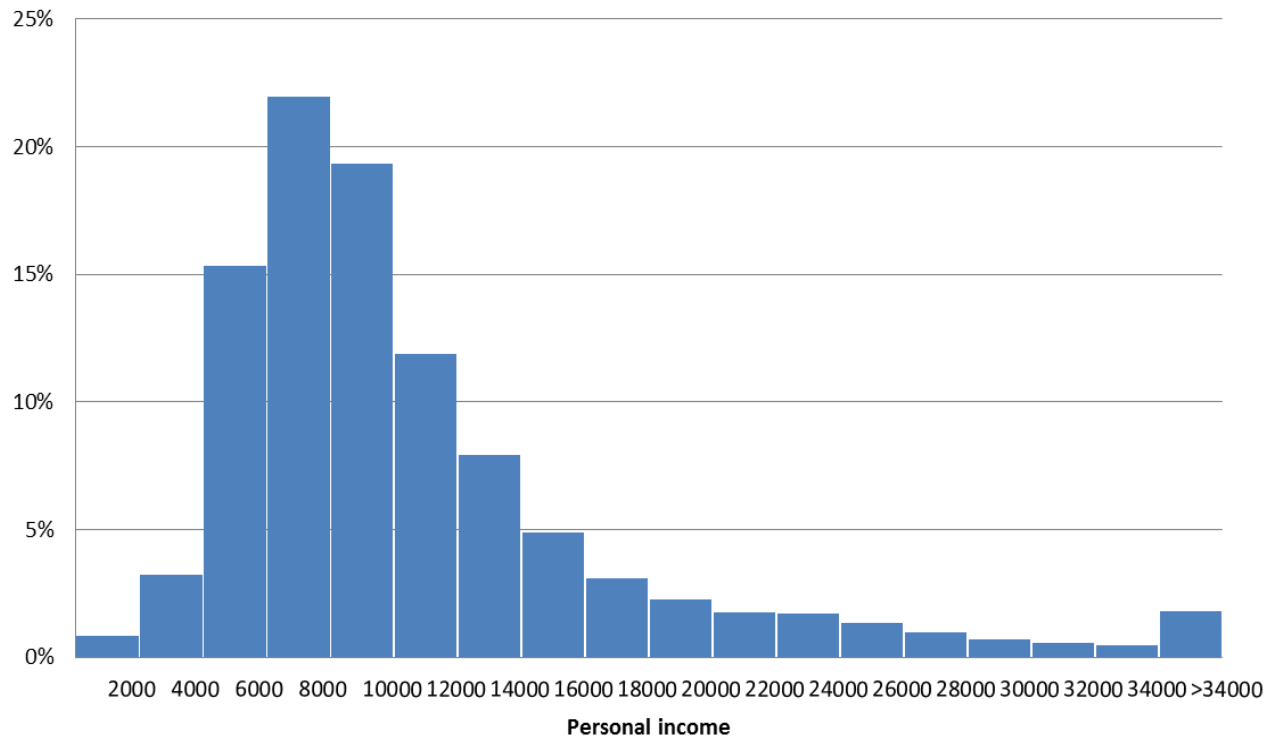
It is important to note that self-rated health status and the health index constructed are not closely correlated (the correlation matrix is presented in Appendix C). This means that these two variables reflect some different aspects of health. Thus, self-rated health status and the health index are used altogether in our further analysis.

The seniors in our sample are distributed unevenly by the level of school completed. The most frequent option is technical community college, medical, music, pedagogical, and art training schools (based on completed secondary education). The second popular level is higher education with a university degree (called ‘specialist’). But there are also some people who completed only general school or those who started but did not complete secondary school (Fig. 5).



**Figure 5. Distribution of completed school levels among seniors (0 – no education at all; 23 – Ph.D. courses and doctoral degree), RLMS-HSE panel sample, 2009-2012.**

The distribution of seniors’ personal incomes takes the rather predictable lognormal shape: most elderly have their modest pensions as the only source of income, while others (and less numerous) work and get earnings or enjoy additional incomes from real property or deposits (Fig. 6).



**Figure 6. Personal income distribution among seniors, RLMS-HSE panel sample, 2009-2012 (roubles per month, 2009 prices)**

The descriptive statistics of our sample are summarized in Table 2. Figures 2-6 presented above show a sufficient variation in the main factors chosen for LS analysis. The variables 2-13 will be used as explanatory in all regression models of LS.



**Table 2. Descriptive statistics of the sample, seniors 55+, RLMS-HSE 2009-2012.**

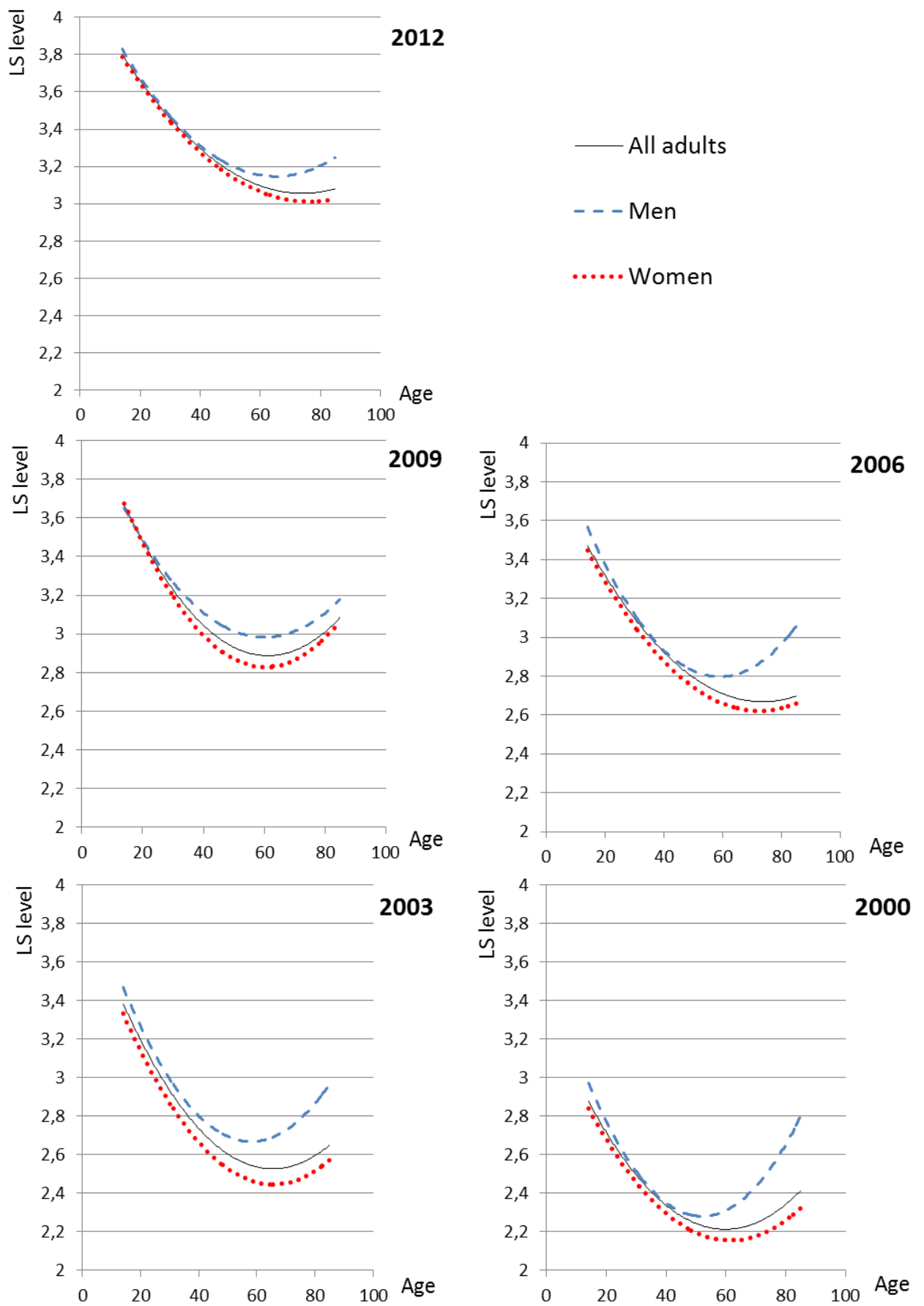
Number of observations		5920			
RLMS-HSE waves		18-21			
<i>NN</i>	<i>Variable</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>Maximum</i>
1	Life satisfaction (1 – not at all satisfied, 5 – fully satisfied)	3.09	1.09	1	5
2	Age	67.15	8.17	55	98
3	Sex (1 – male, 0 – female)	0.31	0.47	0	1
4	Type of settlement (1 – city, 0 –village)	0.67	0.47	0	1
5	Self-rated health (1- very bad, 5 – very good)	3.24	0.68	1	5
6	Health index (0 – no diseases included in principal components; higher the index worse the health )	0.86	0.65	0	2.86
7	Smoking (1 – yes, 0 – no)	0.15	0.37	0	1
8	Education (0 – no primary education, 23 – completed post-graduate course and doctoral degree)	14.89	5.53	0	23
9	Total personal income, roubles per month (in 2009 prices)	11003.16	10022.31	0	431985.3
10	Employment status (1 – holds a job, including self-employment, 0 – otherwise)	0.26	0.44	0	1
11	Social status (1 – absolutely not respected, 9 – very respected)	6.35	1.66	1	9
12	Marital status (1 – has a spouse or partner, 0 – otherwise)	0.5	0.5	0	1
13	Children (1 – has children, 0 – no children)	0.93	0.26	0	1

## 7. Methods and results

First of all, we tried to find out whether the U-shaped relation between age and happiness often found in previous research was applicable to Russian data. To do this, we used six separate cross-sectional samples of all adults aged 15+ from different years of the RLMS-HSE (2000, 2003, 2006, 2009 and 2012). The average levels of LS for men, women and people of different ages are shown in Figure 7. Though the “age – life satisfaction” profiles vary a little from year to year, the U-shape is quite steady. The lowest life satisfaction occurs from 50 to 70, depending on the year and gender. One could mention not only age and LS correlation, but also the evident discrepancy between male and female LS level. On average, men are happier than women and it becomes more evident with age. In youth, the LS levels of girls and boys are almost the same, however, after 60 and especially after 70, male LS level becomes 20% higher compared to women of the same age. Moreover, men reach their minimum LS level earlier than women. So the results of this simple graphical analysis count in favour of our first hypothesis concerning age and gender influence on life satisfaction of elderly.

Since the shapes of age-life satisfaction profiles differ year by year and the minimums of LS found also vary, we decided to check whether a time factor has an impact on happiness. It is to be recalled that LS level is measured with just one RLMS-HSE question that provides information on self-assessed satisfaction with “life in general”. However, one could imagine that a “good year” or “bad year” might influence a respondent’s attitude.

We started our regression analysis on the RLMS-HSE 2009-2012 sub-sample with a *pooled regression model* of life satisfaction (Model 1), where among the other explanatory variables listed in Table 2, a variable of time (*year*) was included. The model was estimated for the total sample of adults 55+, and for women and men separately. And despite the “time factor” being insignificant, the regressions itself, as well as many other variables, were found to be significant (Table 3). The variables of age and gender turned out to be insignificant for the total sample. It is interesting to note that the coefficients at significant variables differ for males and females. Thus, health index, income, job and marital status affect the LS level more substantially for women than for men. The existence of children has a strikingly negative influence on female LS, but no effect on male life satisfaction. This shows that there is circumstantial evidence for the impact of the gender factor on an individual’s happiness.



**Figure 7. “Age – life satisfaction” profiles for men, women and all adults 15+. RLMS-HSE cross-section samples (2000, 2003, 2006, 2009, 2012).**

**Table 3. Pooled regression model of life satisfaction, including variable of time (Model 1).**

Variable	Total sample	Women	Men
	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
Age	0.0204 (0.0259)	0.0681** (0.0297)	-0.0895 (0.0562)
Age^2	-0.0014 (0.0185)	-0.0331 (0.0211)	0.0725* (0.0408)
Sex	0.0097 (0.0342)		
Type of settlement	-0.1162*** (0.0293)	-0.1209*** (0.0359)	-0.1321** (0.0513)
Health status	-0.3712*** (0.0228)	-0.3764*** (0.0277)	-0.3639*** (0.0402)
Health index	-0.1246*** (0.0235)	-0.1441*** (0.0271)	-0.0868* (0.0474)
Smoking	-0.1110*** (0.0413)	-0.1600** (0.0791)	-0.1115** (0.0490)
Education	-0.0075*** (0.0027)	-0.0069** (0.0032)	-0.0078 (0.0048)
Income (ln)	0.0938*** (0.0162)	0.1466*** (0.0298)	0.0808*** (0.0196)
Job	0.1402*** (0.0367)	0.1279*** (0.0485)	0.0996* (0.0604)
Social status	0.1301*** (0.0081)	0.1209*** (0.0098)	0.1487*** (0.0142)
Marital status	0.2085*** (0.0302)	0.2553*** (0.0357)	0.1127* (0.0590)
Children	-0.0827 (0.0515)	-0.1031* (0.0619)	0.0026 (0.0936)
Year	0.0146 (0.0120)	0.0113 (0.0146)	0.0156 (0.0211)
Cons.	-27.8551 (24.0076)	-23.2133 (29.2717)	-25.7751 (42.3097)
Number of observations	5920	4020	1900
Wald statistics or F-statistics	73.78	52.34	27.23
Prob > chi2 or Prob > F	0	0	0

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Using the RLMS-HSE panel data, we then estimated five different specifications of regression models to compare and aggregate the results according to our research hypotheses (Models 2-6). All the models were estimated for the total sample, and for men and women separately, by analogy with the pooled model, using the same variables NN 2-13 from Table 2 as

explanatory.  $R^2$  for linear models does not exceed 16% but it is a normal situation for that number of observations and variables. Model adequacy was tested with the F-test and all the models turned out to be valid at a 0.001 significance level (P-values are given in Appendix D, Tables D1-D3). The results of the Wald test show that statistically significant difference between males and females could be found only with an ordered logit model (Table D4 in Appendix D).

We estimated *linear regression with random effects* (random effect model – RE), giving us the possibility to take into account unobservable individual differences among respondents on the assumption that these differences have random nature. The next step was to estimate *linear regression with fixed effects* (fixed effect model – FE). This also takes into account unobservable individual differences, but unlike the RE model, it treats these differences as constant in time. The Hausman test for RE and FE models revealed that the latter is preferable (Table D1 of Appendix D). However, working with individual data one naturally supposes that individual random effects could exist because the sample represents a huge multimillion population. Thus, it is worth estimating an RE panel as well. We considered both options.

Since the endogenous variable, LS, takes on discrete values (1, 2, 3, 4 and 5), it made sense to use multiple choice models. Therefore, we analysed *ordered logit regression* where the dependent variable LS took five possible values. The average marginal effects and cut-offs estimated are shown in Table D5 of Appendix D. The marginal effect for dummy variables was calculated as a difference between the estimated probabilities of the dependent variable when the independent variable had the value 0 or 1. Based on these estimates, one could note that health status and marital status have the most substantial effect on the probability to be in a group with LS equal to 1 (the lowest life satisfaction). Growth in health status and marital status by 1 changes the probabilities to be in the group LS=1 at 4.9% and -2.8%, respectively. The probability to be in group LS=2 is affected mostly by an individual's health status (8.8%), marital status (-4.9%), social status (-3.1%) and type of settlement (3.2%). The only significant factor determining the probability of being in a medium group with LS=3 is health status (1.5%). The probability to be included in the group LS=4 is influenced by health status (-11.6%), marital status (6.4%), type of settlement (-4.2%), social status (4.1%), job (3.7%), health index (-3.6%), and children (3.1%). The important determinants to be very happy (LS=5) are health status (-3.7%) and marital status (2.1%).

Next, we used two models estimating the probability of “high” or “low” life satisfaction. To do this, we re-codified all the values of our LS variable so that the answers “1”, “2” and “3” were changed to “0” (low satisfaction), and the answers “4” and “5” were changed to “1” (high satisfaction). Then we estimated *panel logistic regression with random effects* and *panel logistic regression with fixed effects*. Again, the Hausman test showed the preferable model with fixed

effects (Table D3 in Appendix D). However, based on the same reasons above, we considered both models – FE and RE. Coefficients estimated for these models reflect the qualitative effects most important for our analysis (Table D3 in Appendix D). The marginal effects reflecting quantitative effects were not estimated as they could not be compared to different models. For example, in a fixed effect model, the marginal effect is a conditional probability of LS (conditional on status change), but for the random effect model it is the absolute probability of LS.

The coefficients estimated for all five models are presented in Table 4 below (the tables with full information are in Appendix D). All the models (2-6) turned out significant. However, the significance of the coefficients estimated depended on variables and model specifications.

Based on the empirical analysis of individual RLMS-HSE cross-sectional and panel data, we can state the following:

1. The relationship between age and life satisfaction, taking a U-shape on aggregate data for all adults aged 15+, changes in later life. For females aged 55+, we observed an inverse U-relation of LS and age. In all models (1-6), the coefficients at “age” variable were significant and positive; coefficients at the “age<sup>2</sup>” variable were significant in models (2), (3) and (6) and negative in all models. The same relation was found for the total sample according to models (3) and (6). But for the sub-sample of males, there was no significant correlation of age and LS. The only exception was in the ordered logit regression (model 4) which showed an opposite relation: the coefficient at the “age” variable was significant and negative, but at the “age<sup>2</sup>” variable it was significant and positive.
2. The variable “sex” turned out to be insignificant in all the models, including the pooled regression (Model 1). However, one could observe steady differences of the coefficients in models estimated for males and females separately. For example, health index and employment status were mostly significant for female LS, but insignificant for male. Marital status and level of personal income also seem more important for women than for men (corresponding coefficients were all significant but for women they were higher in absolute magnitude).

**Table 4. Regression models of life satisfaction based on panel data (Models 2-6).**

Variable	(2) Linear regression with random effects			(3) Linear regression with fixed effects			(4) Ordered logit regression			(5) Panel logistic regression with random effects			(6) Panel logistic regression with fixed effects		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
Age	0,0565	0.0953**	-0,0247	0.2598***	0.2861***	0,2183	0,0265	0.1143**	-0.1919*	0,1513	0.2707**	-0,0976	0.7051***	0.7938**	0,5415
Age^2	-0,0274	-0.0527*	0,0256	-0.1645***	-0.1788***	-0,1434	0,007	-0,0521	0.1561**	-0,0676	-0,1448	0,0929	-0.4380**	-0.4840**	-0,3431
Sex	0,0146						0,0069			0,0241					
Type of settlement	-0.1274***	-0.1263**	-0,1524	-0.9674*	-0.9627*		-0.2549***	-0.2534***	-0.3036***	-0.4769***	-0.4060**	-0.6738***	-13,661	-13,3437	
Health status	-0.2691***	-0.2737***	-0.2648***	-0.1518***	-0.1563***	-0.1449***	-0.6990***	-0.7043***	-0.7001***	-0.7378***	-0.7598***	-0.7031***	-0.3438***	-0.3998***	-0,2281
Health index	-0.1179***	-0.1382***	-0,0685	-0,0484	-0.0727*	0,0191	-0.2169***	-0.2589***	-0,1309	-0.3605***	-0.3665***	-0.3778**	-0,1088	-0,0745	-0,2008
Smoking	-0,0663	-0,1188	-0,059	0,1106	0,0508	0,1231	-0.1717**	-0.2626*	-0.1629*	-0,1466	-0,2973	-0,1489	0,1268	-0,1971	0,1703
Education	-0,0039	-0,004	-0,0024	0,0129	-0,0021	0.0303*	-0.0113**	-0.0108*	-0,01	-0,0105	-0,0104	-0,005	0,0093	-0,0183	0,0427
Income (ln)	0.0779***	0.1133***	0.0703***	0.0547***	0,0482	0.0575***	0.1804***	0.2608***	0.1571***	0.2378***	0.3227***	0.2138***	0.1469*	0,079	0.1778*
Job	0.1750***	0.1898***	0,1112	0.2044***	0.2894***	0,0672	0.2219***	0.2070**	0,1469	0.4769***	0.5494***	0,2552	0.6028***	0.9305***	0,2512
Social status	0.1144***	0.1064***	0.1299***	0.0936***	0.0866***	0.1069***	0.2485***	0.2291***	0.2899***	0.3168***	0.2915***	0.3670***	0.2502***	0.2215***	0.3025***
Marital status	0.1924***	0.2381***	0,0989	0,1037	0,1163	0,0967	0.3921***	0.4657***	0.2363**	0.4430***	0.5575***	0,2314	0,0944	0,204	-0,1592
Children	-0,0815	-0,0969	-0,0277	-0,0778	-0,0201	-0,1321	-0.1915**	-0.2391**	-0,0121	-0,3398	-0.4611*	-0,0132	-0,1282	0,1708	-0,4134
Cons.	0,1699	-1,518	3,1604	-6.9797***	-7.8122**	-6,1384				-8.4569**	-13.4731***	0,6902			
R^2	14.6%	14.3%	15.5%	4.4%	3.9%	5.9%									

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

3. In all the models (except Model 6), the variable “type of settlement” proved to be significant with negative coefficient. Thus, living in a city decreases the LS of males and females both.
4. The variable of self-rated health was significantly and negatively correlated with LS level for men, women and for the total sample in all the models (1-6). The same was true for health index, but only for women since for men the coefficient at this variable was usually insignificant (except in Models 1 and 5).
5. Smoking turned out to be significant in two models only (Models 1 and 4), with a negative coefficient sign for men and for women.
6. The “education” variable was insignificant in all models except (1) and (4). All the significant coefficients were negative and small in absolute magnitude.
7. Income level had an unambiguous positive influence on the LS variable: almost all the coefficients in all the models are significant and positive (for females higher than for males).
8. The variable “job” demonstrated a significant and positive correlation with LS for elderly women but not for men.
9. Social status turned out to be significantly correlated to LS for men and women in all the models (1-6). For males, the corresponding coefficients are greater.
10. Marital status was significant and positively related to LS level for men, women and the total sample in models (1) and (4), and for women and the total sample in models (2) and (5).
11. The variable “children” turned out to be significant only for women and only in models (1), (4) and (5). All the significant coefficients and almost all insignificant coefficients at this variable were negative.

To return to the four groups of LS determinants named as research hypotheses, we can admit that all of them actually influence the life satisfaction of seniors, though to different extents. Thus, among the *personal characteristics* of seniors, age was a significant determinant of female LS. Life in a city impacts LS adversely for men and women. Gender was not a significant variable itself, but we found significant differences in determinants of well-being for males and females. *Health status and healthy behaviour* were important predictors of an elderly individual’s LS. Almost all of the *socioeconomic characteristics* were also found significant except education. The *family factors* of life satisfaction proved to be less important for elderly, especially concerning the role of children.



## 8. Discussion and conclusions

This paper demonstrated that for all Russian seniors aged 55+ the main determinants of LS are: health status, personal income, type of settlement, and social status.

The factor of age was important only for females, and the result was consistent with the findings of previous research that showed an inverse U-relation of age and happiness for the oldest old (Chen, 2001; Gwozdz & Sousa-Poza, 2009; Mroczek & Spiro, 2005; Steptoe et al., 2012).

Our study did not reveal a direct correlation between sex and LS. But we found definite gender differences in LS determinants as many other authors did (Meggiolaro & Ongaro, 2013; Sheung-Tak & Chan, 2006; Takashi, 2011; Wallace, 2008). Thus, marital status turned out to be a more important factor of LS for elderly females than for males – something typical for many other countries. But for Russian elderly we found also a specific gender difference, namely, holding a job is positively correlated to LS of women but not for men. Perhaps for female elderly, employment is not only a source of income but also a kind of social activity – usually more important for women than for men.

The self-rated health status was a strong predictor of LS, but the health index constructed on the basis of “real health problems” was found less important and again significant only for females. This phenomenon could be explained with the fact that women more often visit doctors and are better informed about their health status than men.

Based on various model specifications, we found no correlation or weak correlation between education and LS that corresponds to other studies (Cid et al., 2007; Kudo et al., 2007). The weak impact of education on LS is negative and is consistent with the findings of Fernandez and Kulik (1981). Such a result could reflect the higher wants of those better educated.

Our analysis revealed a negative relation between LS and having children. Unfortunately, the RLMS-HSE individual questionnaire did not provide information on co-residence and/or frequency of contacts between elderly and their adult children. Therefore we cannot say whether co-residence with grown-up children or scarce contact with them are a source of parental unhappiness.

Summarizing the results of the study we could state that many determinants of happiness are the same for Russian elderly and for seniors in other countries. Taking into account the ongoing process of population ageing, policymakers should develop a sound strategy towards the elderly. This should be based on the revealed factors of LS, paying special attention to the oldest old, creating possibilities for health promotion and prolonged working lives, but also making cities age-friendly.

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## Socioeconomics determinants of life satisfaction: survey results

Socioeconomic determinants of life satisfaction	Authors	Sample (country, age groups)	Results
	<i>Personal characteristics</i>		
Age	Aistov & Leonova (2011)	Russia, all ages 15+	Result depends on the model's specification
	Andreenkova (2010)	Russia, 18+	LS declines with age until 55-60 years, then increases to some extent and then decreases again after 70
	Blanchflower & Oswald (2008)	Data from multiple sources including a survey in 72 developed and developing countries, 20+ (United Kingdom, 16+)	U-shaped relationship between psychological well-being and age
	Chen (2001)	Taiwan, 65+	LS of elderly declines after age of 65
	Diener et al. (2009)	Literature review	Though age and SWB are correlated, this correlation is not strong and depends on components of SWB being measured
	Dolan et.al. (2008)	Literature review	U-shaped relationship between age and SWB with the lowest LS between 32 and 50 years, depending on the study
	Edwards & Klemmack (1973)	USA, 45+	Significant negative correlation between age and LS
	Fernandez & Kulik (1981)	USA, all ages	Positive relationship between age and LS
	Guriev & Zhuravskaya (2007)	Data from multiple sources including a survey in 28 post-communist countries, all ages	LS in transition countries is U-shaped as well as in non-transition countries. But in transition countries the minimum point of LS is achieved at a substantially older age
	Gwozdz & Sousa-Poza (2009)	Germany, 16+	U-shaped relationship between age and LS for people between 16 and 65, but after 65 sharp LS decline for oldest old
	Larson (1978)	Literature review; Americans, 60+	No consistent independent relation of age to well-being
	Miller (2013)	Literature review	Weak correlation or no correlation between age and LS
	Mroczek and Spiro (2005)	USA, males, 65+	LS increases until the age of 65 and then declines
Myers and Diener (1995)	Literature review	No relation of age to happiness	
Stephoe et. al. (2012)	England, 52+	Inverse U-relation with maximum LS at 70-79 for men and 60-69 for women	
Gender	Larson (1978)	Literature review, Americans, 60+	No consistent independent relation of sex to well-being
	Meggiolaro and Ongaro (2013)	Italy, 65+	Some variations in factors of LS attributed to sex
	Sheung-Tak and Chan (2006)	China, 60+	Social relationship as LS determinant is more important for women than for men
	Takashi (2011)	Japan, between 50 and 75 years	Certain gender differences in LS factors (family and social connections play a major role for women but not for men)



	Wallace (2008)	USA, 65+	Concerning LS determinants, no differences were found between males and females
	Wang et al. (2002)	Japan, 65+	Specific gender factors of happiness were found for males and females (social support from others - for males; age – for females)
<b>Type of settlement</b>	Bramston et al. (2002)	Australia, all ages	No significant association between subjective quality of life and community level variables
	Fernandez and Kulik (1981)	USA, all ages	LS of rural inhabitants is higher, than of those living in city
	Smith et al. (2004)	United Kingdom, 60+	Subjective variables are more important among determinants of elderly LS than the fact of living in poor rural area
	Zaidi et al. (2009)	29 countries from Eastern Europe and the former Soviet Union, 18+	People living in metropolitan areas are less likely to be satisfied with their lives compared to those living in other urban or rural areas
	<b><i>Health status and healthy behaviours</i></b>		
<b>Health</b>	Angner et al. (2009)	USA, 50 - 65 age group	Moderate positive correlation between self-rated health and happiness
	Borg et al. (2006)	Sweden, 65+	Positive correlation between overall self-reported health and LS
	Borg et al. (2008)	6 European countries: Sweden, United Kingdom, Netherlands, Luxembourg, Austria, Italy, 65+	Overall health is a strong predictor of LS
	Chen and Short (2008)	China, 80+	Positive correlation between well-being and self-reported health
	Gwozdz and Sousa-Poza (2009)	Germany, 75+	Positive correlation between LS and the self-rated health status
	Larson (1978)	Review of USA studies	Subjective health is a strong predictor of SWB
	Takashi (2011)	Japan, between 50 and 75 years	Subjective health is the most important predictor of LS
<b>Healthy behaviours</b>	Fernández-Ballesteros et al. (2001)	Spain, 65+	Physical and leisure activity influence LS directly
	Franco et al. (2012)	United Kingdom (mean age 55.8 years) USA (mean age 58.7 years)	Significant negative correlation between smoking status and life quality for men
	Kudo et. al. (2007)	Japan, 65+	Healthy habits enhance LS measured using moral scale
	McAuley et al. (2006)	USA, older people (mean age 68 years)	Physical activity is positively linked to quality of life, through physical and mental health status
	Steptoe et. al. (2012) Wallace (2008)	England, 50+ USA, 65+	Smoking is positively correlated with depressive symptoms. Positive correlation between physical activity and LS levels
<b><i>Socioeconomic characteristics</i></b>			
<b>Education</b>	Cid et al. (2007)	Uruguay, 60+	Education has no definite impact on happiness
	Fernandez & Kulik (1981)	USA, all ages	Lower education level is correlated with higher LS
	Kudo et. al. (2007)	Japan, 65+	Education level doesn't influence LS of elderly
	Pinquart and Sorensen	Meta-analysis of 286 empirical studies; samples	Weak positive correlation between education level and SWB

	(2000)	including older adults	
<b>Income</b>	Cid et al. (2007)	Uruguay, 60+	Positive correlation between income level and LS
	Fernández-Ballesteros et al. (2001)	Spanish, 65+	Positive impact of income on LS
	Larson (1978)	Literature review, Americans, 60+	Lower income relates to lower well-being
	Li et al. (2012)	China, elderly population: the average age 77	Income is one of the determinants of happiness
	Pinquart and Sorensen (2000)	Meta-analysis of 286 empirical studies; all samples including older adults	Weak positive influence of income on well-being
	Revicki and Mitchell (1990)	USA, 65+	Lower income level is associated with lower scores on LS
	Wallace (2008)	USA, 65+	Higher individual's income level, higher is her LS scores
<b>Employment status</b>	Hao (2008)	USA, aged 55 to 66	Official employment as well as volunteering have positive impact on SWB
	Morrow-Howell et al. (2003)	USA, 60+	Volunteering have a positive association with SWB
	Wallace (2008)	USA, 65+	Retired elderly demonstrate higher level of LS than those still working
<b>Social status</b>	Larson (1978)	Literature review, Americans, 60+	Occupational status is associated with well-being
	Zaidi et al. (2009)	29 countries from Eastern Europe and the former Soviet Union, 18+	In countries of Eastern Europe and the former Soviet Union life satisfaction is positively correlated with self-assessed social status regardless of respondent's age
<b><i>Family relationship</i></b>			
<b>Family status</b>	Buber and Engelhardt (2008)	11 European countries: Austria, Belgium, Denmark, France, Germany, Greece, Italy, The Netherlands, Sweden, Switzerland and Spain, 50+	The family status (having a spouse or a partner) positively influences well-being
	Chen and Short (2008)	China, 80+	Co-residence with immediate family (spouse or children) has positive impact on SWB
	De Jong Gierveld et al. (2012)	France, Germany, Russia, Bulgaria, Georgia, 60+	Those seniors who are married or live with a partner rate their well-being higher than singletons
	Gaymu and Springer (2010)	The data for Austria, Belgium, Germany, Denmark, The Netherlands, Sweden, France, Greece, Italy, Spain, 60+	Marital status is significant determinant of LS. Being divorced has a negative influence on LS, compared to being widowed. Being never-married has a positive impact on individual LS.
	Nanthamongkolchai et al. (2009)	Thailand, elderly female aged between 60-80 years	Positive impact of family relationships on elderly female happiness
	Polverini and Lamura (2005)	Literature review, Italy, 65+	Family relationships have the strongest impact on LS among older people

	Takashi (2011)	Japan, between 50 and 75 years	Positive association of family relationships and LS
<b>Children</b>	Buber and Engelhardt (2008)	11 continental European countries: Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Sweden, Switzerland and Spain, 50+	Frequency of contacts with children is an important determinant of mothers' LS, though the role of this factor varies between the countries investigated
	Chyi and Mao (2011)	China, from 60 to 94 years old	Co-residence with adult child has a negative influence on elderly happiness. But living with grandchildren increases their happiness
	Gaymu and Springer (2010)	The data for Austria, Belgium, Germany, Denmark, The Netherlands, Sweden, France, Greece, Italy, Spain, 60+	Having frequent contacts with children is a strong predictor of LS for women living alone in southern Europe while for those in northern and central European countries they are not so important
	Meggiolaro and Ongaro (2013)	Italy, 65+	Co-residence or frequent contacts with adult children have positive influence on LS of women and men
	Pinquart and Sorensen (2000)	Meta-analysis of 286 empirical studies; all samples including older adults	Quality of contacts with children is more important determinant of older adults well-being than quantity of such contacts
	Rosenmayr (1983)	Germany	SWB of elderly depends more on quality of contacts with adult children, than on quantity of contacts
	Takashi (2011)	Japan, between 50 and 75 years	Co-residence with adult son decreases LS of older men and women. Co-residence with married son enhances parent's LS

**RLMS-HSE questions used to estimate life satisfaction and its determinants**

**Life satisfaction**

*To what extent are you satisfied with your life in general at the present time?*

- Fully satisfied
- Rather satisfied
- Both yes and no
- Less than satisfied
- Not at all satisfied

**Self-rated health**

*How would you evaluate your health? It is:*

- Very good
- Good
- Average--not good, but not bad
- Bad
- Very bad

**Chronic diseases:**

*Do you have any kind of chronic illness? (Yes / No )*

- Heart disease
- Lung disease
- Liver disease
- Kidney disease
- Gastrointestinal disease
- Spinal problems

**Disability degree:**

*Tell me, please: Are you assigned to any disability classification?*

- Yes/No

**Arterial blood pressure:**

*Have you ever been told by a doctor that you had high arterial blood pressure?*

- Yes/No

**Height**

*What is your height in centimeters?*

**Weight**

*How many kilograms do you weigh?*

**Healthy behavior (smoking)**

Do you now smoke?

- Yes/No

**Income**

*Try to remember, please: What is the total amount of money that you personally received in the last 30 days. Please include everything: wages, retirement pensions, premiums, profits, material aid, incidental earnings, and other receipts, including foreign currency, but convert the currency into rubles.*

**Employment status**

*Let's talk about your primary work at present. Tell me, please:*

You are currently working

You are on paid leave (maternity leave or taking care of a child under 3 years of age)

You are on another kind of paid leave

You are on unpaid leave

You are not working

**Social status**

*And now another nine-step ladder where on the lowest step stand people who are absolutely not respected, and on the highest step stand those who are very respected. On which of the nine steps are you personally standing today?*

LOWEST	HIGHEST
STEP	STEP
01 02 03 04 05 06 07 08 09	

**Marital status**

*What is your marital status?*

Never married

First marriage

Second marriage

Divorced

Widower/widow

Married, but don't live together

**Children**

*Do you have children, either your own or officially adopted?*

Yes/No

## Correlation matrix

	LS	Age	Age^2	Sex	Type of settlement	Health status	Health index	Smoking	Education	Income (ln)	Job	Social status	Marital status	Children
<b>LS</b>	1													
<b>Age</b>	0.02	1												
<b>Age^2</b>	0.02	1	1											
<b>Sex</b>	0.06	-0.11	-0.11	1										
<b>Type of settlement</b>	-0.04	0.01	0.01	-0.04	1									
<b>Health status</b>	-0.26	0.31	0.31	-0.12	0.01	1								
<b>Health index</b>	-0.17	0.25	0.24	-0.2	0.08	0.46	1							
<b>Smoking</b>	-0.02	-0.2	-0.2	0.45	0	-0.09	-0.17	1						
<b>Education</b>	0.01	-0.32	-0.32	0.05	0.25	-0.19	-0.05	0.04	1					
<b>Income (ln)</b>	0.13	0.02	0.02	0	0.16	-0.05	0.01	-0.07	0.17	1				
<b>Job</b>	0.11	-0.43	-0.42	0.11	0.08	-0.25	-0.21	0.09	0.25	0.32	1			
<b>Social status</b>	0.24	-0.01	0	0	0.07	-0.11	-0.02	-0.02	0.12	0.15	0.12	1		
<b>Marital status</b>	0.08	-0.31	-0.31	0.39	-0.04	-0.1	-0.12	0.16	0.14	-0.02	0.08	0.02	1	
<b>Children</b>	0	-0.06	-0.06	0.01	-0.06	-0.01	0.01	-0.01	0.02	0.03	0.03	0.01	0.14	1

## Regression models (2-6) estimates

Table D1

Variable	(2) Linear model with random effects			(3) Linear model with fixed effects		
	Total sample	Women	Men	Total sample	Women	Men
	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
Age	0.0565 (0.0347)	0.0953** (0.0399)	-0.0247 (0.0737)	0.2598*** (0.0772)	0.2861*** (0.0934)	0.2183 (0.1413)
Age^2	-0.0274 (0.0249)	-0.0527* (0.0284)	0.0256 (0.0537)	-0.1645*** (0.0569)	-0.1788*** (0.0683)	-0.1434 (0.1062)
Sex	0.0146 (0.0483)					
Type of settlement	-0.1274*** (0.0425)	-0.1263** (0.0516)	-0.1524** (0.0753)	-0.9674* (0.5254)	-0.9627* (0.5299)	
Health status	-0.2691*** (0.0231)	-0.2737*** (0.0284)	-0.2648*** (0.0401)	-0.1518*** (0.0272)	-0.1563*** (0.0336)	-0.1449*** (0.0468)
Health index	-0.1179*** (0.0266)	-0.1382*** (0.0310)	-0.0685 (0.0518)	-0.0484 (0.0367)	-0.0727* (0.0435)	0.0191 (0.0688)
Smoking	-0.0663 (0.0534)	-0.1188 (0.1049)	-0.0590 (0.0628)	0.1106 (0.0968)	0.0508 (0.2164)	0.1231 (0.1070)
Education	-0.0039 (0.0037)	-0.0040 (0.0045)	-0.0024 (0.0067)	0.0129 (0.0120)	-0.0021 (0.0167)	0.0303* (0.0171)
Income (ln)	0.0779*** (0.0165)	0.1133*** (0.0325)	0.0703*** (0.0191)	0.0547*** (0.0197)	0.0482 (0.0438)	0.0575*** (0.0218)
Job	0.1750*** (0.0420)	0.1898*** (0.0555)	0.1112 (0.0684)	0.2044*** (0.0585)	0.2894*** (0.0781)	0.0672 (0.0927)
Social status	0.1144*** (0.0083)	0.1064*** (0.0101)	0.1299*** (0.0144)	0.0936*** (0.0097)	0.0866*** (0.0120)	0.1069*** (0.0166)
Marital status	0.1924*** (0.0406)	0.2381*** (0.0478)	0.0989 (0.0782)	0.1037 (0.0879)	0.1163 (0.1065)	0.0967 (0.1564)
Children	-0.0815 (0.0681)	-0.0969 (0.0839)	-0.0277 (0.1171)	-0.0778 (0.1354)	-0.0201 (0.1933)	-0.1321 (0.1888)
Cons.	0.1699 (1.2104)	-1.5180 (1.4332)	3.1604 (2.5089)	-6.9797*** (2.6719)	-7.8122** (3.2708)	-6.1384 (4.7344)
Number of observations	5920	4020	1900	5920	4020	1900
Wald statistics or F-statistics	569.98	376.92	194.36	16.62	10.71	7.19
Prob > chi2 or Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman test						
Chi2(11)	104.87					
Prob > chi2	0.0000					

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table D2**

Variable	(4) Ordered logit regression		
	Total sample	Women	Men
	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
Age	0.0265 (0.0488)	0.1143** (0.0558)	-0.1919* (0.1058)
Age^2	0.0070 (0.0350)	-0.0521 (0.0398)	0.1561** (0.0770)
Sex	0.0069 (0.0630)		
Type of settlement	-0.2549*** (0.0539)	-0.2534*** (0.0660)	-0.3036*** (0.0953)
Health status	-0.6990*** (0.0432)	-0.7043*** (0.0526)	-0.7001*** (0.0766)
Health index	-0.2169*** (0.0430)	-0.2589*** (0.0500)	-0.1309 (0.0860)
Smoking	-0.1717** (0.0756)	-0.2626* (0.1433)	-0.1629* (0.0904)
Education	-0.0113** (0.0049)	-0.0108* (0.0059)	-0.0100 (0.0090)
Income (ln)	0.1804*** (0.0307)	0.2608*** (0.0545)	0.1571*** (0.0375)
Job	0.2219*** (0.0665)	0.2070** (0.0874)	0.1469 (0.1112)
Social status	0.2485*** (0.0153)	0.2291*** (0.0184)	0.2899*** (0.0276)
Marital status	0.3921*** (0.0555)	0.4657*** (0.0650)	0.2363** (0.1116)
Children	-0.1915** (0.0958)	-0.2391** (0.1153)	-0.0121 (0.1761)
Cons.			
Number of observations	5920	4020	1900
Wald statistics or F-statistics	971.76	638.58	334.33
Prob > chi2 or Prob > F	0.0000	0.0000	0.0000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table D3**

Variable	(5) Panel logistic regression with random effects			(6) Panel logistic regression with fixed effects		
	Total sample	Women	Men	Total sample	Women	Men
	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
Age	0.1513 (0.1072)	0.2707** (0.1247)	-0.0976 (0.2231)	0.7051*** (0.2636)	0.7938** (0.3157)	0.5415 (0.4966)
Age^2	-0.0676 (0.0767)	-0.1448 (0.0886)	0.0929 (0.1623)	-0.4380** (0.1941)	-0.4840** (0.2306)	-0.3431 (0.3729)
Sex	0.0241 (0.1470)					
Type of settlement	-0.4769*** (0.1301)	-0.4060** (0.1607)	-0.6738*** (0.2222)	-13.6610 (627.6311)	-13.3437 (561.7685)	
Health status	-0.7378*** (0.0776)	-0.7598*** (0.0953)	-0.7031*** (0.1343)	-0.3438*** (0.0923)	-0.3998*** (0.1129)	-0.2281 (0.1635)
Health index	-0.3605*** (0.0849)	-0.3665*** (0.0994)	-0.3778** (0.1650)	-0.1088 (0.1225)	-0.0745 (0.1439)	-0.2008 (0.2366)
Smoking	-0.1466 (0.1664)	-0.2973 (0.3333)	-0.1489 (0.1912)	0.1268 (0.3310)	-0.1971 (0.9418)	0.1703 (0.3592)
Education	-0.0105 (0.0115)	-0.0104 (0.0141)	-0.0050 (0.0200)	0.0093 (0.0427)	-0.0183 (0.0604)	0.0427 (0.0618)
Income (ln)	0.2378*** (0.0627)	0.3227*** (0.1162)	0.2138*** (0.0738)	0.1469* (0.0768)	0.0790 (0.1238)	0.1778* (0.1047)
Job	0.4769*** (0.1348)	0.5494*** (0.1821)	0.2552 (0.2136)	0.6028*** (0.1933)	0.9305*** (0.2721)	0.2512 (0.2911)
Social status	0.3168*** (0.0279)	0.2915*** (0.0340)	0.3670*** (0.0489)	0.2502*** (0.0336)	0.2215*** (0.0412)	0.3025*** (0.0590)
Marital status	0.4430*** (0.1250)	0.5575*** (0.1489)	0.2314 (0.2367)	0.0944 (0.2795)	0.2040 (0.3260)	-0.1592 (0.5443)
Children	-0.3398 (0.2108)	-0.4611* (0.2623)	-0.0132 (0.3562)	-0.1282 (0.4791)	0.1708 (0.6702)	-0.4134 (0.6812)
Cons.	-8.4569** (3.7599)	- (4.5163)	0.6902 (7.6123)			
Number of observations	5920	4020	1900	3200	2160	1040
Wald statistics or F-statistics	355.23	232.01	127.41	119.58	80.93	45.36
Prob > chi2 or Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman test						
Chi2(11)	94.98					
Prob > chi2	0.0000					

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table D4. Wald test on differences between male and female sub-samples**

	Linear regression with random effects	Linear regression with fixed effects	Ordered logit regression	Panel logistic regression with random effects	Panel logistic regression with fixed effects
chi2(12)	12.13	0.7	22.57	12.28	6.64
Prob > chi2	0.4349	0.7392	0.0316	0.4235	0.8276

**Table D5. Average marginal effects and cut-offs for ordered logit regression**

Variable	Pr(LS=1) (Std. Err.)	Pr(LS=2) (Std. Err.)	Pr(LS=3) (Std. Err.)	Pr(LS=4) (Std. Err.)	Pr(LS=5) (Std. Err.)
Age	-0.0015 (0.0035)	-0.0027 (0.0061)	-0.0005 (0.0011)	0.0036 (0.0081)	0.0012 (0.0026)
Age^2	-0.0007 (0.0025)	-0.0013 (0.0044)	-0.0002 (0.0008)	0.0017 (0.0058)	0.0006 (0.0019)
Sex	-0.0004 (0.0045)	-0.0008 (0.0079)	-0.0001 (0.0014)	0.001 (0.0104)	0.0003 (0.0033)
Type of settlement	0.0174 (0.0036)	0.0319 (0.0068)	0.0065 (0.0016)	-0.0418 (0.0088)	-0.0139 (0.0031)
Health status	0.0497 (0.0035)	0.088 (0.0054)	0.0153 (0.0016)	-0.1159 (0.0069)	-0.0371 (0.0029)
Health index	0.0154 (0.0031)	0.0273 (0.0054)	0.0047 (0.001)	-0.036 (0.0071)	-0.0115 (0.0023)
Smoking	0.0128 (0.0059)	0.0216 (0.0095)	0.003 (0.001)	-0.0287 (0.0126)	-0.0087 (0.0036)
Education	0.0008 (0.0003)	0.0014 (0.0006)	0.0002 (0.0001)	-0.0018 (0.0008)	-0.0006 (0.0003)
Income (ln)	-0.0127 (0.0022)	-0.0224 (0.0038)	-0.0039 (0.0008)	0.0296 (0.0051)	0.0095 (0.0017)
Job	-0.015 (0.0043)	-0.0279 (0.0084)	-0.0058 (0.002)	0.0366 (0.011)	0.0121 (0.0038)
Social status	-0.0175 (0.0012)	-0.031 (0.0019)	-0.0054 (0.0006)	0.0409 (0.0024)	0.0131 (0.001)
Marital status	-0.0276 (0.004)	-0.0492 (0.007)	-0.0086 (0.0014)	0.0648 (0.0092)	0.0206 (0.0031)
Children	0.0126 (0.006)	0.0236 (0.0119)	0.0052 (0.0032)	-0.0308 (0.0153)	-0.0107 (0.0058)
Cut-offs					
Cut1	-0.2715 (1.7089)				

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Cut-offs	
Cut2	1.6014
	(1.7087)
Cut3	2.6566
	(1.7089)
Cut4	5.4326
	(1.7099)

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