



Consequences of Raising The Retirement Age for the Labor Market in the Regions of Russia

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ABSTRACT

The article presents the results of a study aimed at assessing the consequences for the labor market of raising the retirement age in Russia. The foreign experience of raising the retirement age, on the basis of which a number of characteristic moments of this process are highlighted, is presented. The review of the scientific literature showed a polemical character of the problem under investigation and allowed to formulate a hypothesis of the study, which is as follows: raising the retirement age will lead to an increase in the supply of labor, which will entail the reduction of the labor price. The article presents an analysis of the current situation in the labor market. Since the raise of the retirement age will require the availability of vacant jobs in an amount not less than the number of people detained in the labor market, two tasks have been solved in this study. In the first task, the change in the average wage was calculated, provided that the number of jobs will meet the increased need, i.e. unemployment will remain at the same level. In the second task, the number of jobs is fixed to estimate the potential effect of raising the retirement age. Evaluation of the effect of raising the retirement age with a fixed number of jobs was carried out by constructing a regression relationship between wages and unemployment, differences in age groups were taken into account by introducing fictitious shift and tilt variables into the model. According to the calculations obtained under the first and second tasks, wages will decrease with the raising of the retirement age by one year for both sexes. The results of the study showed that the decision to raise the retirement age should be accompanied by a number of serious additional measures, primarily in the employment of population sector.

INTRODUCTION

The population of Russia is rapidly aging, which is a great challenge for the existing social institutions (pension system, labor relations, etc.), thus the interest in this problem continues to exist (Kuklin et al., 2018; Vasileva, 2017; Chistova, 2016). However, the approach to its solution has been substantially redefined recently. The ongoing research and development of state measures in the field of aging and enhancing the standard of living of older people are based on a new approach, which consists in focusing not so much on providing various mechanisms of social protection as on stimulating the development and use of the potential of older people. As part of this approach, the concept of active longevity, developed in the 1990s under the influence of the WHO, aimed at addressing the issue of ageing population, has become widespread (Zaidi, 2015; Chan-sarn, 2012; Walker, 2002). These ideas are reflected not only in scientific research, but also in state documents and draft laws. Recently, the Russian government has started systematic development of state policies to stimulate employment of elderly people (encouraging later retirement in the new "pension formula", the policy of active longevity in the "Strategy of Actions for the Benefit of Citizens of the Elderly Generation"). And in June 2018, a draft law was introduced for consideration, providing for the gradual raising of the retirement age. As a common retirement age, it is planned to establish 65 years for men and 60 years for women¹. At the same time, it is planned to provide a transitional period with the annual raising of the retirement age for one year.

Table 1. Raise of the retirement age in foreign countries

Country	Year of raising completion	Retirement age for men, years		Retirement age for women, years		Gender difference
		initial	planned	initial	planned	
Austria	2033		65 (65)	60 (60)	65	no
Belgium	2030	65 (65)	67	65 (65)	67	no
UK	2028 / 2046	65 (65)	67 / 68	65 (65)	67 / 68	no
Germany	2031	65 (65.58)	67	65 (65.58)	67	no
Greece	2015 / 2021*	65 (67)	67	65 (67)	67	no
Denmark	2022 / 2030*	65 (65)	67	65 (65)	67	no
Ireland	2028	66 (66)	68	66 (66)	68	no
Spain	2027	65 (65.5)	67	65 (65.5)	67	no
Italy	2022*	66 (66.58)	67	62 (65.58)	67	no
Canada**	2029	65 (65)	67	65 (65)	67	no
Poland**	–	(65)	–	(60)	–	yes
USA	2027	66 (66)	67	66 (66)	67	no
France**	2023	65 (62)	67	65 (62)	67	no
Estonia	2026	63 (63.5)	65	60 (63.5)	65	no
South Korea	2017 / 2033	55 / 60 (60)	60 / 65	55 / 60 (60)	60 / 65	no
Japan	2030	60 (62)	65	60 (62)	65	no

Note: The current retirement age (2018) is indicated in brackets.

* In Denmark, Greece, Italy, the retirement age will be directly related to the increase in life expectancy. For example, in Denmark since 2030, the retirement age will be raised by a maximum of one year every five years, depending on the increase in the average life expectancy.

** In some countries there is both a minimum retirement age and a full one. In Canada, you can claim a pension at the age of 60. In France, employees can retire upon reaching the minimum retirement age (62 years), but they can continue working to receive a full pension.

*** In Poland until 2017, it was planned to raise the retirement age to 67 years by 2020 for men and by 2040 for women. In 2016, the retirement age for men was 65.58 years, for women – 60.58 years.

Source: Retirement Ages in Member States // Finnish Centre for Pensions. [Electronic resource]. URL: https://web.archive.org/web/20150924002828/http://www.etk.fi/fi/service/retirement_ages/1601/retirement_ages (access date: 09/17/2018); (Feng et al., 2018)

¹ Address of the President to the citizens of Russia // The President of Russia. [Electronic resource]. URL: <http://kremlin.ru/events/president/transcripts/speeches/58405#sel=5:1:yfw,8:52:6ch> (access date: 09/17/2018).

The raising of the retirement age is the simplest tool that provides a more favorable balance between the number of working population and pensioners. Such measure is a common response to the aging of the population and the associated socio-economic and financial problems (Gurvich, 2011). In many countries, the process of adjusting national pension programs towards raising the retirement age is currently underway. Table 1 presents the parameters of such raise in individual countries, on the basis of which a number of characteristic features of this process can be identified.

First, the retirement age is currently 65 years in most European countries but there is a process of its raising to 67 years and 68 years in such countries as the United Kingdom and Ireland. In the future, in a number of countries it is planned to link the raising of the retirement age with the increase in life expectancy (Denmark, Greece, Italy). Secondly, the process of raising the retirement age is a long-term one and has a transitional period. The raising is carried out starting with 1–2 months per calendar year at the beginning and finishing with 3–4 months at the end of the transitional period (Solovyov, 2015a). Thirdly, any gender differences in the retirement age are eliminated. In almost all countries, the retirement age for women is equal to or close to the retirement age for men. Fourthly, the process of raising the retirement age is a complex political initiative that faces great social resistance. There are examples where, under pressure from the population, trade unions, and the expert community, national governments have been forced to postpone such measures or to raise the retirement age in a more lenient manner (Gorlin et al., 2017). The most striking example of this is the changes in retirement age that took place in Poland. In 2012, the Polish authorities adopted a program of the gradual raising of the retirement age for men and women to 67 years. However, as early as 2017, the party that won the parliamentary elections, one of the pre-election promises of which was an earlier retirement, achieved a reduction in the retirement age for men to 65 and for women to 60 years.

The legally established retirement age in Russia is the lowest among all countries with a national compulsory pension provision (Solovyov, 2015a). To date, the retirement age for men starts at 60 and for women at 55. It was established as early as 1932 based on studying the condition of workers retired for a disability pension and, since then, has not been raised, even though the nature of labor and working conditions have noticeably changed (Sinyavskaya, 2005). It is all the more surprising that the issue of raising the retirement age in Russia has been brought up at the legislative level, the initiators of which plan to ensure the soundness and financial stability of the pension system due to the obvious connection. This relationship is clearly visible in the balance equation of the pay-as-you-go pension system:

$$s \cdot v \cdot u = p \cdot n,$$

Where s is the rate of contributions for pension provision, %;

v is the average nominal wage, rubles;

u is the number of insured workers, thousand people;

p is the average nominal pension, rubles;

n is the number of pensioners, thousand people.

Reducing the number of pension recipients and increasing the number of payers of insurance contributions will help to balance the budget of the Pension Fund of the Russian Federation (PFR) (Solovyov et al., 2015; Vishnevsky et al., 2012; Gurvich, 2010). However, the pension system is not isolated from other spheres of the economy, and its changes affect not only itself. Raising the retirement age can greatly change the Russian labor market. This will naturally lead to an increase in the labor force in the market, which can provoke an increase in unemployment and a decrease in wages. The aim of this study is to assess the impact of the raising of the retirement age in Russia on the level of wages, taking into account the possible increase in the unemployment rate of the population.

1. REVIEW OF LITERATURE

In the foreign literature, studies of the impact of raising the retirement age on the actual growth of employment are widely presented, since in most countries the process of adjusting the national pension programs is already being actively implemented. In the UK, the raise of the early retirement age has led to an increase by 6.3 percentage points in the employment of women aged 60–61 (Cribb et al., 2016). In Austria, the early retirement age was raised from 60 to 62 for men and from 55 to 58.25 for women. A study by S. Staubli and J. Zweimüller (2013) shows that such increase in employment has led to an increase by 9.75 percentage points among men and by 11 percentage points among women. The same study estimates the side effects of raising the retirement age. In particular, according to the calculations presented in Austria, unemployment increased by 12.5 percent among men and by 11.8 per cent among women. Other studies have also expressed concern about the possible increase in unemployment. Based on the results of the modeling by P. J. Stauvermann and J. Hu (2018), by 2038 the labor force in China will have increased by approximately 33 million older workers who will have to work if the retirement age is to be raised to 65 years. They note that an appropriate number of additional jobs are to be created every year in order to keep the unemployment rate unchanged.

In some studies (Solovyov, 2015b; Cherkashina, 2011), difficulties in finding work for the elderly as well as young people and the growth of unemployment among these age groups are considered as possible risks in the raising of the retirement age. In studies (Bogdanova, 2016, Bashkireva et al., 2016) it is emphasized that in the labor market the competitiveness of persons who have reached retirement age is extremely low. Additional measures and investments will be required to ensure the effective use of their labor, since the elderly population is characterized by its low efficiency and has less adaptive capacity to the changing demands of the economy (Chizhova, 2008). A number of studies do not confirm the hypothesis that increasing the employment of the elderly will lead to increased unemployment among young workers (Social security programs..., 2010, Barr and Diamond, 2009). As rightly noted by V. Lyashok and S. Roshchin (2017), there is a sectoral segregation between the two age groups of workers, they are more likely to compete with middle-aged workers than among themselves. Such conclusions do not exclude the growth of the general unemployment of the population against the background of the raising of the retirement age.

Appearing additional workers may lead to a reduction in wages in the labor market, for which there are prerequisites. First, in conditions when supply exceeds demand, the price of labor is reduced, especially in those sectors of the economy where the largest share of employed persons are those of pension and pre-retirement ages. The studies by Yu. Sonina and M. Kolosnitsyna (2015) show that among all employed pensioners the share of those working in education, healthcare, science, housing and communal services, the Ministry of the Interior and the military-industrial complex (sectors of the economy with the predominant role of the state) has grown during the period under review. At the same time, some studies (Ivanova et al., 2017, Korovkin et al., 2006) consider the raising of the retirement age as a tool for alleviating the labor shortage. However, the future shortage of labor resources is assessed exclusively in an extensive dimension, without taking into account the growth of labor productivity, robotization, the emergence of new technologies, and other possible achievements of scientific and technological progress that ensure the economization of human labor (Aizinova, 2017). In addition, it is necessary to take into account the quality of human capital of the remaining workers in the labor market due to deferred retirement. The state of health of the older generation is quite low and thus limits their performance. Surveys of enterprises (Kovalin and Moiseev, 2014) show that we are talking, first of all, about the shortage of skilled labor. With age, the need for retraining workers to maintain their skills only increases, which requires certain investments. This issue is especially acute in the context of the creation and modernization of high-performance jobs.

Secondly, with the raising of the retirement age, the labor market will be replenished with workers with relatively low wages, since Russia is characterized by a rather early and sharp decline

in wages in older ages. Analysis of the labor market in Russia, conducted by the Higher School of Economics (*The Russian labor...*, 2017), states a very early peak in earnings (in 35–39 years), while in most countries it comes in pre-retirement years. The wages can react by decreasing on the developed age differentiation.

Thirdly, another feature of the Russian labor market, i.e. gender differences in wages, can also cause the reduction of the level of labor remuneration. The gender differences occur as inter-industry level – specifically female employment is mainly characterised by low labor remuneration – and within sectors, which indicates gender differences in the status positions (Kalabikhina, 2011). According to approximate calculations of A. G. Korovkin, E. A. Edinak, and I. B. Korolev (2015), should the retirement age for both sexes be raised to 65, the increase in the labour supply by almost 70 per cent would be achieved by an increase in women in the labour market.

As foreign studies show, raising the retirement age can negatively affect the standard of living of the entire population. J. Cribb and C. Emmerson (2018) attempted to assess the impact of raising the retirement age on household living standards in the UK. In their study, they concluded that raising the retirement age from age 60 to 63 reduces the net income of women aged 60–62 years an average of £32 (\$42) per week, and for women in low-income households, the poverty rate is higher by 6.4 percentage points. H. Fehr, M. Kallweit and Kindermann F. (2010) estimated the effect of increasing the normal retirement age from 65 to 67 years in a cross-generational model, finding that a higher retirement age leads to higher levels of old age poverty.

Foreign experience of raising the retirement age and a sufficiently large number of hypothetical assumptions about its consequences in Russia are widely presented in the scientific literature. Within the framework of this research, the following working hypothesis was tested: raising the retirement age will lead to an increase in the supply of labor, which will entail the reduction of the labor price.

2. RESEARCH DATA

The official data of the Federal State Statistics Service, including data obtained from sample surveys of the population with regard to employment (labor force surveys) and ²comprehensive observations of the living conditions of the population³ were used as a basis for investigating the consequences of raising the retirement age. According to these data, in 2000–2017 the level of employment increased from 58.4% to 65.5% (Figure 1).

This growth is typical for all age groups, except for young people. For this period, employment of the population under age of 25 decreased, especially during periods of economic instability. The employment rate among the population of 15–19 years old decreased from 10.1% to 5.7%, and among those 20–24 years old – from 57.3% to 48.7%. In particular, the decline in youth activity in the labor market was caused by the intensified outflows to study at the entrance of the Russian economy into stagnation. For young people, higher education has become a social norm (*The Russian labor...*, 2017).

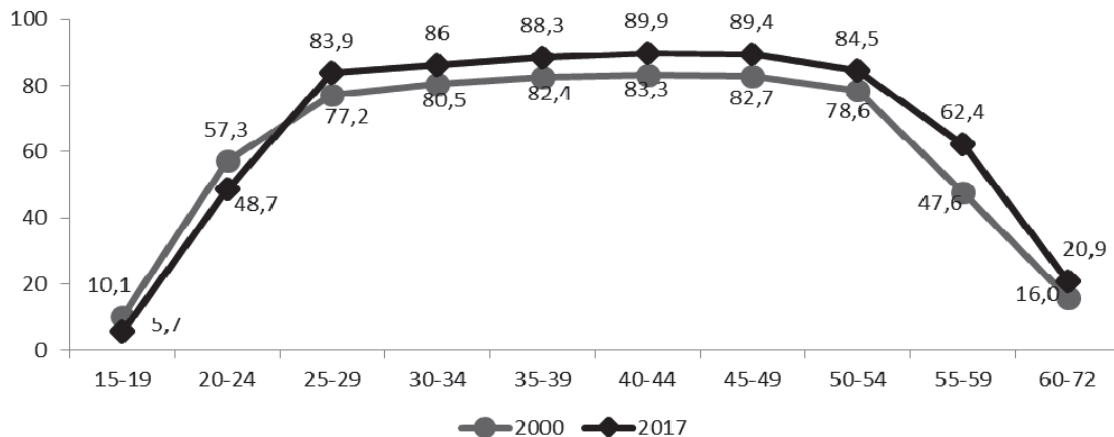
In 2000–2017 the maximum increase in the level of employment occurred among the population of 55–59 years old (from 47.6% to 62.4%), i.e. those of pre-retirement and retirement ages. But over the past 3 years, the employment of persons over 55 years of age is declining, in 2016 only the share of working pensioners decreased from 35.7% to 22.9%, which is associated with the

² Labor Force Survey // Federal Service of State Statistics. URL: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1140097038766 (access date: 09/17/2018); Labor force, employment and unemployment in Russia // Federal Service of State Statistics. URL: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1139918584312 (access date: 09/17/2018).

³ Comprehensive observation of the living conditions of the population // Federal Service of State Statistics. [Electronic resource]. URL: http://www.gks.ru/free_doc/new_site/KOUZ16/index.html (access date: 09/17/2018).

entry into force of the federal law⁴ providing for the non-indexation of pensions to working pensioners.

Figure 1. Employment rate by age groups in Russia, %



This decrease in the economic activity of pensioners confirms that their employment is rather forced, and the level of their labor remuneration is low. In 2017, the average wage of employees at the age of 55–59 years was RUB 34,315, which is 11.1% lower than the average in the economy, although in 2005 this gap was 0.2%. Most of the population over 50 years of age is engaged in low-paid economic activities ("Agriculture, Forestry, Hunting, Fishing and Fish Industry", "Manufacturing", "Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles", "Transportation and Storage" "Education", and "Activities in the Field of Health and Social Services"). According to data as of 2017, the share of working people aged 50–59 years in these sectors of the economy was 65.2%, and at the age of 60–72 years – 65.8%. In addition, regardless of the sectoral affiliation of the labor market, there is an age differentiation in terms of wages (Klepikova and Kolosnitsyna, 2017). In all types of economic activity, the wage level of those employees over 50 years of age is less than the average for this type of activity.

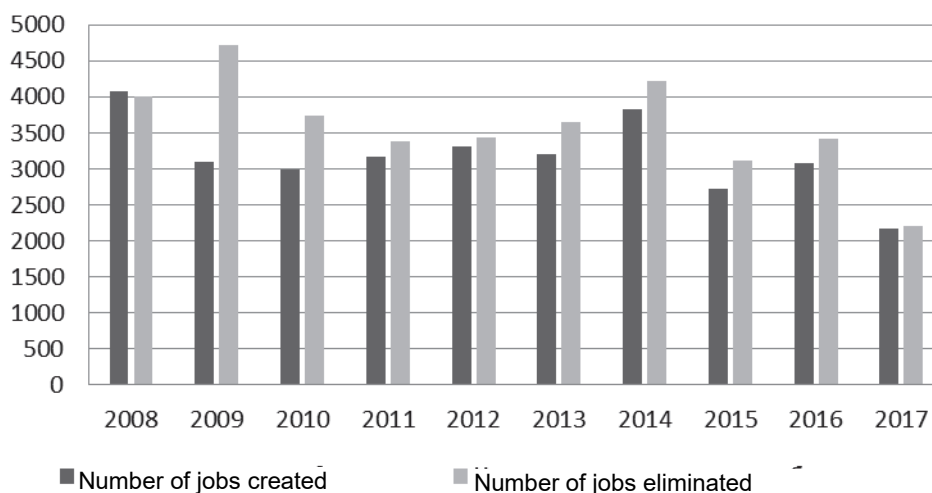
Raising the retirement age can be a serious challenge for the Russian labor market, which will face an increase in the supply of labor with low efficiency and requirements for retraining. The financial and economic crisis of 2008–2009 posed a similar challenge, which led to a sharp increase in unemployment in all age groups and a decrease in real wages. To avoid a surge in unemployment and the growth of social tension, the government has supported a number of large enterprises, thus preventing massive releases of workers. Almost immediately, an anti-crisis program was developed to reduce tensions in the labor market, this program included four main areas: the organization of public works and the creation of temporary jobs; advanced training of employees; facilitating the relocation of the unemployed; assistance to small business and self-employment among the unemployed (Varshavskaya, 2012).

The most extensive was the organization of public and temporary works, which accounted for 72% of all funds allocated under the anti-crisis package, and 87% of participants (Modernization and development..., 2011). As can be seen in Figure 2, in 2008, the balance of jobs movement was slightly positive, the number of created jobs was higher than the number of eliminated ones by 69.5 thousand people. Although already in 2009–2010, the economy lost 2.4 million jobs, and in

⁴ Federal Law No. 385-FZ dated December 29, 2015, "On Suspension of Certain Provisions of the Legislative Acts of the Russian Federation, Amendments to Certain Legislative Acts of the Russian Federation and Specifics of Increasing Insurance Pensions, Fixed Payments to Insurance Pensions and Social Pensions".

subsequent years the balance has remained negative. The measures taken have stabilized the situation on the labor market but at the same time this approach contributes to the restructuring of enterprises, increasing the efficiency of employment and the development of the economy as a whole. Such artificial maintenance of employment leads to the preservation of low-productivity and technologically backward jobs.

Figure 2. The number of jobs created and eliminated (by average number) in Russian organizations (excluding small businesses), thousand people



During the analysis of the current situation and assessment of the consequences of raising the retirement age in the labor market, a certain limitation of the available official statistical information provided by Rosstat was revealed. In particular, there is no possibility to compare data due to the use of different age grouping (both in relation to a single indicator as well as several ones) and the new version of the All-Russian Classifier of Economic Activities⁵ (OKVED-2). For some indicators (for example, the average wage of employees by age group) information is not provided annually, because surveys are conducted every 2 years. In addition, since the data of these sample surveys at the regional level are not sufficiently reliable and representative, Rosstat does not (or not fully) develop information on economic activities (and occupation groups) by RF subjects. As a result of these limitations, several assumptions were made in the study. First, a weighted average is used to provide comparable data for different age grouping. Secondly, the model includes only 69 subjects of the Russian Federation out of 85 for which there is complete statistical information for the current and representative period. In order to minimize the number of assumptions in the study, the assessment of the consequences of raising the retirement age was not based on the forecast estimates of the labor market situation in 2019 (the first year of the planned raising of the retirement age for men and women for one year) but rather on data for the last reporting year used as a statistical base.

⁵OK 029-2014 (CAEU Rev. 2). All-Russian classifier of economic activities (approved by the Order of Rosstandart No. 14-st dd. January 31, 2014) (Edited on March 29, 2013).

3. RESEARCH MODEL

The study of the consequences of raising the retirement age is carried out in two stages. In the first stage, the task is to assess how much the wage will change, provided that the number of jobs meet the increased need, i.e. unemployment will remain at the same level.

The average accrued wages for men and women can be calculated as the arithmetic average weighted

$$\bar{s} = \frac{\sum_{i=15}^{72} s(i)u(i)}{\sum_{i=15}^{72} u(i)}, \quad (1)$$

Where $s(i)$ is the average accrued wages by age of working men and women, i is the age, years ($i = 15, 16, \dots, 72$); $u(i)$ is a number of men and women employed in the economy by age, i is the age, years ($i = 15, 16, \dots, 72$).

The quantitative structure of those employed in the economy will change with the raising of the retirement age, as the labor market will retain 37.2% of the number of 60-year-old men and 33.8% of 55-year-old women⁶ who had to leave. The formula for calculating the number of men and women employed in the economy looks as follows:

$$\tilde{u}_m(60) = u_m(60) + v_m(60) \frac{k_m}{100}, \quad \text{for men,} \quad (2)$$

$$\tilde{u}_f(55) = u_f(55) + v_f(55) \frac{k_f}{100}, \quad \text{for women,} \quad (3)$$

Where $v(i)$ is the average annual number of men (m) and women (f) by age, i is the age, years ($i = 15, 16, \dots, 72$); k is the share of the population finishing its labor activity in the year of old-age pension granting (due to arriving at the generally established retirement age), $k_m = 37,2\%$ and $k_f = 33,8\%$.

The formula (1) looks as follows:

$$\bar{s}_d = \frac{\sum_{i=15}^{72} s_d(i)u_d(i)}{\sum_{i=15}^{72} u_d(i)}. \quad (4)$$

The effect of raising the retirement age in Russia on the level of wages is estimated by comparing the values calculated from formulas (1) and (4). The difference between these values ($\Delta s = \bar{s}_d - \bar{s}$) shows how much the average accrued wages in the region will increase or decrease with the raising of the retirement age by one year:

$\Delta s > 0$ is a positive influence, the average accrued wages will increase;

$\Delta s < 0$ is a negative influence, the average accrued wages will decrease;

$\Delta s = 0$ is a neutral influence, the average accrued wages will not change.

At the second stage of assessing the consequences of raising the retirement age for the labor market, the task was set to investigate the relationship between the level of unemployment and wages in the regions of Russia. In order to assess the potential effect of the growth of supply in the labor market, the number of jobs was fixed in the framework of this task.

In order to exclude differentiation of regions based on the cost of living, the regression analysis is carried out not only for the level of unemployment and the average accrued wages, but also for the unemployment rate and the ratio of the average accrued wages to the subsistence level in the region.

⁶According to the data of the Comprehensive Observation of Population Living Conditions, conducted by Rosstat, 37.2% of men and 33.8% of women finish working in the year of old-age pension granting (due to arriving at the generally established retirement age).

The influence of age on the relationship between unemployment and wages is taken into account by the introduction of five age groups:

- G_0 group: age of 20–29 years,
- G_1 group: age of 30–39 years,
- G_2 group: age of 40–49 years,
- G_3 group: age of 50–59 years,
- G_4 group: age of 60–72 years.

The regression model looks as follows

$$Y_i = \alpha_0 + \alpha_1 X_i + \sum_{j=1}^4 (\alpha_0^j + \alpha_1^j X_i) D_i^j + \varepsilon_i, \quad (5)$$

Where Y_i is the values of the ratio of the average accrued wages to the subsistence minimum in the region; X_i is the values of unemployment rates (in %); ε is a random component (error); $\alpha_0, \alpha_1, \alpha_0^j, \alpha_1^j$ is the theoretical values of regression coefficients; D_i^j is the fictitious shift and tilt variables, taking into account the influence of age, given from the formula

$$D_i^j = \begin{cases} 1, & X_i \in G_j, \\ 0, & X_i \notin G_j. \end{cases}$$

For the model (5) based on the available statistical data $(x_i, y_i), i = \overline{1, N}, N = 5 \cdot 69$, we construct the regression equation using the least squares method

$$\hat{y}_i = a_0 + a_1 x_i + \sum_{j=1}^4 (a_0^j + a_1^j x_i) D_i^j, \quad (6)$$

Where \hat{y}_i is the conditional mean of the value of Y_i ; a_0, a_1, a_0^j, a_1^j are the estimates of the regression coefficients.

From (6) we obtain the regression equations for all five age groups

$$\hat{y}_i^k = a_0^{(k)} + a_1^{(k)} x_i^k, \quad k = \overline{0, 4}, \quad (7)$$

Where $a_0^{(k)} = a_0 + a_0^k, a_1^{(k)} = a_1 + a_1^k$.

Note that for the first four age groups, the coefficients of the explanatory variable were statistically significant with a probability of error of the first kind not more than 0.05. The statistical insignificance of the regression equation (7) for the last age group (60–72 years) is explained by the contradictory trends in this group: people, on the one hand, are experiencing a decline in labor activity, and on the other hand, the share of highly skilled and highly paid workers is increasing.

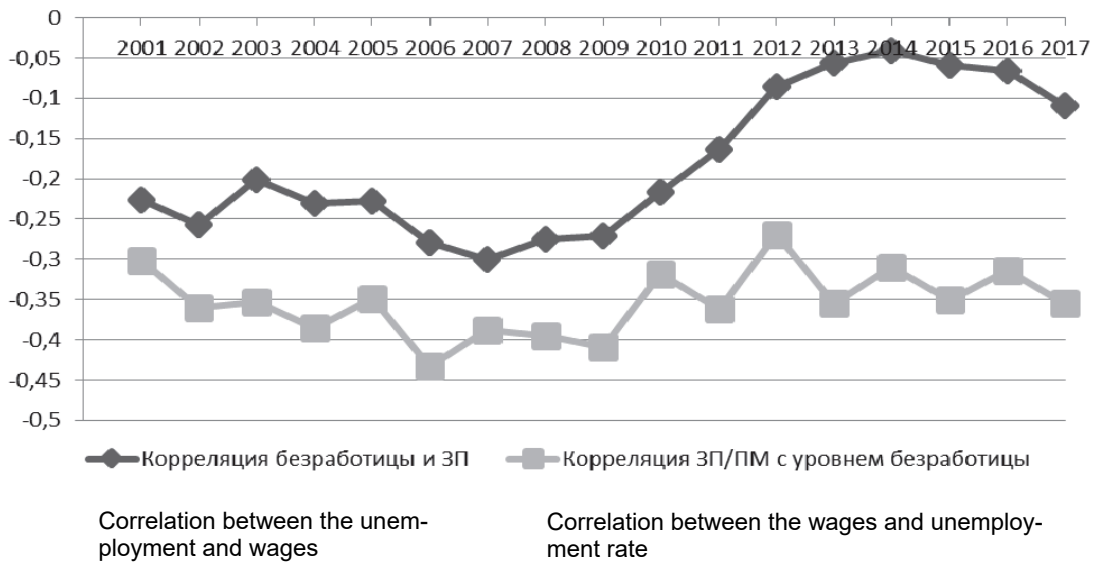
4. RESULTS OF THE STUDY

With the raising of the retirement age for one year, the number of employed people in the economy, according to equations (1–2) as of 2017, will increase by 735.8 thousand people, including 321.95 thousand men and 413.9 thousand women. Based on this growth in labor supply, subject to the preservation of unemployment at the same level, the wages, calculated from the formula (4), will decrease for men by 85.06 rubles, and for women by 29.52 rubles. This decrease is primarily due to the existing age differentiation of wages, and it is only increasing over the period under review. According to Gimpelson V. and Zudina A. (The Russian labor..., 2017), the early and sharp decline in wages in the older ages is caused by the quality of human capital. If investments in updating knowledge and skills are not available or insufficient, the quality of the workforce is

reduced, thus affecting the price of labor. Therefore, older workers are more likely to agree to jobs that involve downward labor mobility than to options that require active retraining (Lukyanova, 2007).

In order to assess the consequences of raising the retirement age for the labor market, the second stage of the study establishes the relationship between the unemployment rate and wages in the regions of Russia in order to assess the potential effect. Correlation coefficients constructed for 2001–2017 are shown in Figure 3.

Figure 3. Correlation coefficients between the unemployment rates and wages in the subjects of the Russian Federation



The relationship between the unemployment rate and the average accrued wages is a weak negative. It reached its peak before the financial crisis of 2008, and during the economic instability markedly decreased. The correlation coefficient approached zero in 2014, when there was an economic recession under the influence of external factors (sanctions, decreasing oil prices), which led to devaluation and increased inflation. By 2017, the link between the unemployment and wages had slightly increased. This dynamics also indicates an increase in regional heterogeneity during periods of instability. To exclude the differentiation of regions based on the cost of living, the regression analysis was carried out for the unemployment rate and the ratio of the average accrued wages to the subsistence minimum in the region. This connection is already stronger – a moderate negative. There have been no sharp changes in the dynamics during the period under review but there has also been a weakening of the link during the crisis period. As the results of the analysis show, the labor market in the regions of Russia is characterized by high flexibility, i.e. the presence of an elastic wage response to a change in the unemployment rate. Such regularity in human behavior and economic trends described in the study by Gimpelson V., Kapelyushnikov R., and T. Ratnikov (2003). Rising unemployment heightens fear among workers, weakening their position and forcing them to reduce their required labor remuneration, and the reduction or freezing of wage growth is holding back unemployment. As economic growth recovers and unemployment declines, this effect weakens.

If the number of jobs continues to increase with the raising of the retirement age, the growth of supply in the labor market will provoke an unemployment increase in all age groups, especially since it is planned to establish criminal liability for employers for dismissing workers of pre-

retirement age. According to the results of the regression analysis (formulas (5)–(7)), the increase in the unemployment rate imposes a greater negative impact on the labor remuneration of the population within the age groups of 30–39 and 40–49 years, while the level of wages of persons of retirement age (60–72 years), on the contrary, slightly increases (Table 2).

Table 2. Coefficients of linear regression

	a_0	a_1
Total, incl. by age groups	3.899	-0.120
20–29 years	3.910	-0.085
30–39 years	4.208	-0.138
40–49 years	4.007	-0.141
50–59 years	3.508	-0.099
60–72 years	2.585	0.006

With the raising of the retirement age, 37.2% of the number of 60-year-old men and 33.8% of 55-year-old women will expand the supply on the labor market, thereby increasing the unemployment rate by 0.908%. Based on the results of the regression analysis, the average accrued wages were calculated for the subjects of the Russian Federation with the raising of the retirement age by one year. According to the calculations, the reduction will amount from RUB 849,6 to 1803,6 depending on the subject of the Russian Federation. The grouping of subjects of the Russian Federation in terms of the ratio of the settlement average wages and the actual ones is made. This value varies from 94.6% to 97.6%, i.e. with the raising of the retirement age the level of the wages will decrease by no more than 6%. Based on the presented grouping, it is clear that its decline is greater in the subjects of the Russian Federation where wages are low.

As shown by calculations, the raising of the retirement age will reduce the level of labor remuneration of the working population. The level of wages of young people (20–29 years old) will be less affected, even in subjects with a "young" age structure. The decrease is more noticeable for the age group of 40–49 years old. Table 3 shows how the average wages will change by age groups in individual subjects of the Russian Federation.

Table 3. The ratio between the estimated average wages and the actual by age groups in the subjects of the Russian Federation with the raising of the retirement age by one year

	Total	incl. by age group				
		20–29 years	30–39 years	40–49 years	50–59 years	60–72 years
Moscow Region	97.5	98.2	97.4	97.2	97.8	100.1
Leningrad Region	97.6	98.2	97.5	97.3	97.8	100.1
Rostov Region	96.4	97.5	96.3	95.9	96.9	100.2
Stavropol Krai	96.4	97.4	96.2	96.0	96.8	100.2
Nizhny Novgorod Region	97.1	97.9	97.0	96.7	97.4	100.2
Sverdlovsk Region	97.0	97.8	96.8	96.6	97.3	100.2
Novosibirsk Region	96.7	97.7	96.5	96.2	97.0	100.2
Khabarovsk Krai	96.7	97.7	96.6	96.3	97.2	100.2

Note: The table shows as an example the subjects of the Russian Federation – the administrative centers of eight federal districts.

According to the results obtained, the wages will increase only for persons of the retirement age (60–72 years) on average for the subjects of the Russian Federation by RUB 47.4. Such multi-directional trends in labor remuneration for the able-bodied and disabled people are related to the peculiarity of employment of pensioners, as well as the calculation of their unemployment rate according to the ILO methodology. As noted in many studies (Lyashok and Roshchin, 2017, Ivanova et al., 2017), evaluation of the unemployment rate among persons of retirement age is seriously underestimated, since pensioners are willing to be economically active only if they are in a busy state, otherwise they leave from the labor market without replenishing the number of unemployed. With the growth of tension in the labor market, household incomes decrease, pensioners, trying to increase them, keep their labor activity, as it was during the periods of economic instability. The majority of them is occupied in the public sector (education, health care, housing and communal services, military-industrial complex, science), whose jobs are not in great demand among other age groups (especially among young people) due to the relatively low labor remuneration (Sonina and Kolosnitsyna, 2015). In addition, the growth of wages in the older generation can be explained by the fact that this age group included 60-year-old men, who previously considered wages as additional income to a pension. With the raising of the retirement age, the wages for those men become the main source of income.

CONCLUSION

According to the study, the raising of the retirement age in the current conditions will have a negative impact on the labor market. Since the raise of the retirement age will require the availability of vacant jobs in an amount not less than the number of people detained in the labor market, two tasks have been solved in this study. In the first task, the change in the average wages was calculated, provided that the number of jobs will meet the increased need, i.e. unemployment will remain at the same level. According to the calculations, with the raising of the retirement age by one year for both sexes, the wages for men will decrease by RUB 85.06, and for women by RUB 29.52, which is due to the age differentiation in labor remuneration.

In the second task, the number of jobs is fixed to estimate the potential effect of raising the retirement age. Based on the analysis results obtained, the decrease in the average accrued wages under such conditions is already higher, it will amount from RUB 849.6 up to RUB 1,803.6 depending on the subject of the Russian Federation. In addition, with the raising of the retirement age, multi-directional trends in labor remuneration for the able-bodied and disabled people have been identified. If the wages of the able-bodied population are reduced, they are, on the contrary, slightly increased for persons of the retirement age, which is associated with the peculiarity of employment of pensioners, as well as with the calculation of their unemployment rate according to the ILO methodology.

The results obtained under the first and second tasks demonstrate the fundamental importance of creating the appropriate number of jobs with the raising of the retirement age. And in the conditions of long-term stagnation it is difficult to provide such, and, as the experience of the financial crisis of 2008 shows, the artificial maintenance of jobs for a long time is difficult and inefficient. Consequently, raising the retirement age can lead to a gradual increase in unemployment and a decrease in the the population income, which will cause an increase in the social expenditures of the budget.

An earlier study (Tyrsin, 2015) showed that the benefit from raising the retirement age is offset by an increase in the costs for unemployment compensation. Moreover, the total additional amount of unemployment compensation will almost coincide with the savings of the PFR due to the raising of the retirement age. Therefore, the problem of balancing the PFR will be solved by the fact that expenditures will be paid not from the PFR, but from other sources, which, in turn, will become scarce.

On the one hand, the raising of the retirement age makes it possible to reduce the amount of the transfer from the federal budget to the PFR. But, on the other hand, there is a danger of growing tension in the labor market, which will increase government obligations (rising unemployment leads to an increase in unemployment compensation, and a reduction in the wages leads to a reduction of the insurance payments to the PFR). It should also be noted that at present there are no objective reasons for the growth of employment. Thus, the decision to raise the retirement age is to be accompanied by a number of serious additional measures, primarily in the employment of the population (creation of efficient jobs, increasing labor productivity and wages, reducing the scale of shadow employment, etc.).

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