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Modeling the Impact of Raising the Retirement Age on Unemployment and Wages in Russia

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Abstract. The article assesses the impact of raising the retirement age on unemployment and wages in Russia. The study defines two tasks in order to model this impact. The first task requires to calculate the change in the average wage, provided that the number of jobs will meet the increased need. In the second task, the number of jobs is steady. The modeling of the impact was assessed by constructing a regression relationship between wages and unemployment, and differences in age groups were taken into account by introducing fictitious shift and tilt variables into the model. The article presents the results of modeling for the case of raising the retirement age by one year. According to calculations completed for the first and second task, after raising the retirement age by one year, the wages will decline. These calculations have shown that, even under favorable conditions in the Russian labor market, the wages will fall and, therefore, it would be impossible to ensure the financial stability of the pension system by raising the retirement age. Lower wages will reduce the revenues of the Pension Fund of Russia, while higher unemployment rate will increase the expenses on unemployment benefits.

1. Introduction

The law on raising the retirement age was adopted in September 2018. The common retirement age was established as 65 years old for men and 60 years old for women. At the same time, the law provides for a transition period with an annual increase of the retirement age by one year. Raising the retirement age is a common response to population ageing and related socio-economic and financial challenges [1]. Lower number of pension recipients and more payers of insurance contributions will allow to balance the budget of the Pension Fund of Russia (PFR) [2]. According to the estimates of the Ministry of Finance [3], the medium-term effect of these measures will result in a steady growth of PFR revenues in 2019–2021 (+5.9%, +4.8%, and +6.8%, respectively), as well as in reduction of transfers from the federal budget for compulsory pension insurance by 9.3 billion rubles in 2020 and as many as 156.3 billion rubles in 2021.

However, not only the pension system itself is affected by these changes; first of all, raising the retirement age may significantly alter the Russian labor market. The emergence of additional workers may increase unemployment and reduce wages in the labor market. Various papers [4–5] point out that

the competitiveness of individuals, who reached the retirement age, in the labor market is extremely low. In some studies [6–7], the difficulties of finding the work for the elderly, as well as for young people, and the growth of unemployment among these age groups are considered as potential risks in raising the retirement age. However, this hypothesis was not supported by the research in other countries [8–9]. As rightly noted by Russian scientists [10], there is a sectoral segregation between the two age groups of workers, as they are more likely to compete with middle-aged employees than among themselves. Therefore, the scientific literature provides a large number of hypothetical assumptions regarding the effects of raising the retirement age in Russia, which are often diametrically opposed. For example, V.Yu. Lyashok, T.M. Maleva, Yu.M. Gorlin [11] argue that the cumulative effect of raising the retirement age significantly exceeds any potential economic and social risks. At the same time, the study by I.V. Shchetinina [12] demonstrated that the necessary costs of pension reform may be higher than savings generated by raising the retirement age. To assess the effects of raising the retirement age, this study aims to model its impact on unemployment and wages.

2. Research model

Two tasks were defined in order to model the impact of raising the retirement age on unemployment and wages. In the first task, the change in the average wage was calculated, provided that the number of jobs would meet the increased need, i.e., unemployment would remain at the same level. In the second task, in order to estimate the potential effect of raising the retirement age, the number of jobs was assumed to remain steady. In the second task, in order to estimate the potential effect of raising the retirement age, the number of jobs was assumed to remain steady. Let us consider the effect in case of raising the retirement age by one year. Obviously, the results will become stronger when the retirement age will be further raised by up to five years.

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 old
- G_1 group: age of 30–39 years old
- G_2 group: age of 40–49 years old
- G_3 group: age of 50–59 years old
- G_4 group: age of 60–72 years old

The regression model looks as follows: $Y_i = \alpha_0 + \alpha_1 X_i + \sum_{j=1}^{4} (\alpha_0^j + \alpha_1^j X_i) D_i^j + \varepsilon_i$, (1)

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_i is a random component (error); α_0, α_1, α_0^j, α_1^j are the theoretical values of regression coefficients; D_i^j is the fictitious shift and tilt variables [13] that take into account the influence of age and are specified by the formula:

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

For the model (1), we used the available statistical data to build the regression equation using the least squares method:

$$\hat{y}_i = a_0 + a_1 x_i + \sum_{j=1}^{4} (a_0^j + a_1^j x_i) D_i^j, \quad (2)$$

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

From (2) we obtain the regression equations for all five age groups: $\hat{y}_i^{(k)} = a_0^{(k)} + a_1^{(k)} x_i^{(k)}$, $k = 0, 1, 2, 3, 4$,

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

3. Research findings

To minimize the number of assumptions in the study, we assessed the effects of raising the retirement age by using a statistical base consisting of the data for the last reporting year rather than the labor market forecasts for 2019 (first year of raising the retirement age for men and women by one year). The data for 2017 show that, after raising the retirement age by one year, the number of employed in the economy will increase by 735.8 thousand, including 321.95 thousand men and 413.9 thousand women. Based on this growth in labor supply and provided that the unemployment will remain at the same level, we calculated the wages, which will decrease by 85.06 rubles for men and 29.52 rubles for women. This decline is primarily due to existing age differentiation of wages, and it is only increasing over the period under review. Therefore, older workers are more likely to agree to jobs that involve downward labor mobility than to options that require active retraining [14].

If, after raising the retirement age by one year, the number of vacancies in the labor market will be no less than the number of individuals retained in the market, the remuneration of managers will decline to a greater extent (by 115.07 rubles), which can be explained by the high wages in this group. In contrast, for unskilled workers in agriculture, forestry, fish farming, and fishing, the wages will decline by no more than 12 rubles.

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

Let us perform a regression analysis to describe the dependence of the ratio of average accrued wages to the subsistence minimum in the region. According to the results of regression analysis, the increase in the unemployment rate makes a greater negative impact on the labor remuneration within the age groups of 30–39 and 40–49 years old, while the level of wages for individuals of retirement age (60–72 years old), on the contrary, increases slightly (Table 1).

Table 1. Coefficients of linear regression.

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

Following the raising of the retirement age, 37.2% of the total number of 60-year-old men and 33.8% of 55-year-old women will expand the labor supply in the market, thereby, increasing the unemployment rate by 0.908%. Based on the findings of regression analysis, the researchers have calculated the average accrued wages by the subjects of the Russian Federation after raising the retirement age by one year. According to these calculations, the decline of such wages will range from 849.6 rubles to 1,803.6 rubles depending on the subject of the Russian Federation [15]. As shown by calculations, the raising of the retirement age will reduce the level of labor remuneration of the able-bodied population. The level of wages of young people (20–29 years old) will be less affected, even in the Russian regions with a "younger" age structure. The decrease is more noticeable for the age group of 40–49 years old. According to our findings, the wages will increase only for persons of the retirement age (60–72 years old) by 47.4 rubles on average for reviewed subjects of the Russian Federation. Such multidirectional trends in labor remuneration for the able-bodied and dependent population 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 [10, 16], the unemployment rate among

persons of retirement age is seriously underestimated, since pensioners are willing to be economically active only if they are employed, otherwise they leave the labor market instead of joining the ranks of unemployed. With higher tensions in the labor market, the household incomes decline, and the pensioners, trying to increase them, maintain their labor activity, as it was during the periods of economic instability. The majority of them is employed in the public sector (education, health care, housing and utilities, defense industry, science), where the jobs are not in great demand among other age groups (especially among young people) due to relatively low labor remuneration [17]. 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 supplementary income to a pension. Once the retirement age is raised, the wages become the main source of income for those men.

Given that even under favorable conditions in the Russian labor market (with unemployment remaining at the previous level), the average wages in the economy will fall, and it would be impossible to ensure the financial stability of the pension system by raising the retirement age. This conclusion is supported by the assessment of the pension system's own revenues based on the left side of the balance equation:

$$S \cdot V \cdot U = P \cdot N, \quad (3)$$

where S is the pension contribution rate, %; V is the average nominal wage, rubles; U is the number of insured employees, thousand; P is the average amount of granted pensions, rubles; N is the number of pensioners, thousand.

It is expected that, after raising the retirement age, the number of payers of insurance contributions will increase (U). However, the results of modeling have shown that the emergence of additional employees will result in a decrease of average wage in the labor market (V) caused by the existing specialization of the elderly in low-income activities and age-related wage differentiation (ageism [18]). Thus, in 2017, the revenues of the pension system amounted to 7,477.5 billion rubles while, with the modeled impact of raising the retirement age on wages and the number of employees, these revenues will be 7,347.0 billion rubles. In other words, our calculations show that, as a result of raising the retirement age, the pension system will lose 130.5 billion rubles only in the first year. Therefore, according to the calculations, the main objective of raising the retirement age (ensuring the sustainability and financial stability of the pension system) will not be achieved. As A.K. Solovyov rightly pointed out [19], this objective can be achieved only by implementing a set of measures not just in the pension system itself, but also within the macroeconomic ("external") factors of the pension system's functioning. Rather than reducing the number of pensioners and using various methods to sequester their pension rights, it is necessary to establish objective conditions in the labor market for realizing the people's labor and employment rights and, accordingly, for earning the rights to a pension from the public pension insurance system. Assessing the chances for employment of individuals, M.L. Agranovich [20] comes to a similar conclusion that raising the retirement age should be accompanied by the elaboration and implementation of measures aimed at ensuring the employment for the relevant population group.

In addition, earlier studies [21–22] have shown that, firstly, according to the calculations in equation (3), the current amount of collected insurance contributions (revenues) even exceeds the funds required for paying the pensions (expenses), as shown in Table 2. Low level of pension provision is associated with the underfunding of federal budget expenses on valorization, additional payments to pensions, compensation for "non-insured" periods (military service, child care, etc.), and shortfall of revenues caused by preferential rates, rather than the pension system deficit.

Table 2. Comparing the revenues and expenses of the Russian pension system in accordance with the balance equation (3).

Parameters of revenues in the equation			Balance (pension surplus), billion rubles	Parameters of expenses in the equation	
S	*V*[1)]	*U*		*P*[2)]	*N*[2)]
2012					
22	26,629	71,545.4	596 5,030 > 4,434	9,153.6	40,367.5
2013					
22	29,792	71,391.5	705 5,615 > 4,910	10,029.7	40,796.0
2014					
22	32,495	71,539.0	749 6,137 > 5,388	10,888.7	41,237.5
2015					
22	34,030	72,323.6	395 6,497 > 6,102	12,080.9	42,092.5
2016					
22	36,709	72,392.6	611 7,016 > 6,405	12,425.6[3)]	42,953.0
2017					
22	39,167	72,315.9	522 7,477 > 6,955	13,323.1	43,504
2018					
22	43,445[4)]	72,531.6	896 8,319 > 7,423	14,102.1	43,865

Source: Rosstat, PFR.

Note:

1) Average monthly nominal accrued wage of employees in a full range of organizations, rubles;

2) As of January 1 of the following year;

3) Excluding the lump sum cash payment provided in accordance with Federal Law No. 385-FZ of November 22, 2016 in the amount of 5 thousand rubles;

4) Preliminary data.

Secondly, the benefits of raising the retirement age are offset by increased expenses on unemployment benefits. Moreover, the total additional amount of unemployment compensation will almost coincide with the savings due to the raising of the retirement age. Therefore, the problem of balancing the pension system will be solved by the fact that expenses will be paid not from the PFR, but from other sources which, in turn, will become scarce.

4. Conclusion

Two main conclusions can be drawn based on the modeling of impact made by raising of the retirement age on unemployment and wages. Firstly, even if the number of jobs meets the increased needs, i.e., the unemployment will remain at the same level, the wages will decline after the rise of the retirement age; moreover, they will decline to a greater extent for men (by 85 rubles) and managers (by 115 rubles). In the current conditions, without creation of additional jobs, the decline of wages is already higher, it will be about 3.4%, ranging from 850 rubles and up to 1,804 rubles depending on the subject of the Russian Federation. Along with lowering the incomes of the population, this will also reduce the deductions from wages to the PFR.

Secondly, the expected growth in PFR's own revenues may be offset by reduced receipts of insurance contributions to the fund due to the decline in wages, and the expected reduction of federal budget transfers may be offset by higher government spending on unemployment benefits.

Therefore, the study has demonstrated that, in the current conditions, raising the retirement age will decrease, rather than increase, the revenues of PFR, negatively affect the labor market, and heighten the social tensions. Therefore, the study has demonstrated that, in the current conditions, raising the retirement age will decrease, rather than increase, the revenues of PFR, negatively affect the labor market, and heighten the social tensions. Such a decision should be accompanied by a number of important additional measures, primarily in the area of employment.

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