Pension models: Comparative Analysis and Prospects of Application in Russia

I V Terentieva
Vladimir State University n.a. A.G. & N.G. Stoletovs, Murom, Russia
E-mail: Terentieva-murom@yandex.ru

Abstract. The article assesses the effectiveness of the pay-as-you-go pension system and the funded pension system as components of the current mixed model of pension provision in Russia. The prospects of their further application in Russia are presented.

1. Introduction

Pension provision is one of the most important areas of research of domestic and foreign scientists. Thus, the problems of reforming the Russian pension system have been widely covered in the works of such researchers as Roik V.D. [1], Mamiy E.A., Novikov A.V. [2]. Considerable attention is paid to the issues of retirement age in the works of Soloviev A.K. [3, 4], Kudrin A.L., Gurvich E.T. [5]. The works of Degtyar L.S. [6], Pudovkin A.V. [7], Fedotov A.I. [8] are devoted to the study of the world experience of pension provision and its possible application in Russia. Among the foreign researchers can be identified the work of Chybalski F. [9], Borella M., Fornero E. [10].

In recent years, scientific interest in this topic has increased significantly due to the worsening problems of pension systems in many countries. These problems are caused by both internal factors and general world trends, primarily demographic. In this regard, it is important to assess the existing models of pension provision and the effectiveness of their implementation, as well as the prospects for further application in Russia.

2. Types of pension models

There are two main models of pension provision: pay-as-you-go (PAYG) pension system and funded pension system.

The PAYG pension system usually operates within the state pension provision. The model is based on the principle of intergenerational solidarity. Pensions to the older generation are paid from the pension contributions of the younger generation of working age. The amount of pension depends on the employee's salary and length of service.

The advantages of the PAYG pension system are stable and predictable pension, independence from the financial market, and simple organization of the financing system. The disadvantage of the model is its vulnerability to the demographic factor.

The funded pension system can operate both within the state and private pension provision. In this model, the pension savings of each participant are formed in specialized funds through periodic contributions from his salary. The amount of pension depends on the size of contributions and the rate of return of pension assets.
The advantages of the funded pension system are: the ability to influence the size of future pension; the provision of resources for infrastructure investments; the development of financial market. The disadvantage of the model is the dependence on the financial market conditions, as well as the quality of investment of pension savings.

In the world, mixed pension systems are most often created. They combine both models with the predominance of one of them. For example, the PAYG pension system dominates in Austria, France and Italy, and the funded pension system – in Chile, Iceland and the Netherlands. However, the PAYG pension system plays a fundamental role in most countries of the world.

3. Evaluation of the efficiency of pension models in Russia

In Russia, a mixed pension system has been established since 2002 in accordance with global trends. We will evaluate the effectiveness of its components.

The efficiency of the PAYG pension system can be assessed by the following indicators:

1. Replacement rate

In Russia, the PAYG pension system provides a replacement rate of 35% of average earnings. The same indicator for OECD countries is on average 40.6%. For countries where the PAYG pension system is predominant, the replacement rate is higher: Turkey - 69.9%, Spain - 72.3%, Portugal - 74%, Austria - 78.4%, Italy - 83.1% [11].

2. Number of gainfully employed per pensioner

The number of pensioners in Russia is growing, which is in line with world trends. The ratio of the number of employed in the economy and pensioners decreased from 2.07 in 1992 to 1.57 in 2017 [12]. If this trend continues, the replacement rate in the PAYG pension system will decline.

3. Public expenditure on pensions as a percentage of GDP

Public expenditure on pensions is 9% of GDP, which corresponds to the average for OECD countries – 8.9% [11]. In countries where the PAYG pension system is predominant, the level of public expenditure on pensions ranges from 7.2% to 16.2% of GDP. At the same time, the replacement rate is higher than in Russia.

4. Pension system deficit

The amount of collected insurance contributions is not enough to pay social insurance pensions. The deficit was 1.92 trillion rubles as of 01.01.2017 (Table 1). The deficit financing sources are the federal budget funds transferred to the Pension Fund of the Russian Federation. About 2% of GDP is allocated for these purposes annually. The total amount of transfers from the federal budget varied from 3 to 3.9% of GDP in the period under review. In OECD countries, the amount of budget support is on average 2.4% of GDP [13].

| Table 1. Pension system deficit (as of January 1 of each year). |
|---------------------------------------------------------------|
|                                                              |
| **Insurance contributions, billion rubles**                   |
| 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|
| 2 944 | 3 661 | 3 862 | 4 130 |

| **Payment of social insurance pension, billion rubles**       |
| 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|
| 4 833 | 4 977 | 5 782 | 6 050 |

| **Deficit** |
|-------------|
| - in billion rubles | -1 889 | -1 316 | -1 920 | -1 920 |
| - as a percentage of the pension payments | 39.09 | 26.44 | 33.20 | 31.74 |
| - as a percentage of GDP | 2.6 | 1.7 | 2.3 | 2.2 |

| **Federal budget funds transferred to the budget of the Pension Fund of the Russian Federation** |
|---------------------------------------------------------------|
| **Insurance contributions, billion rubles**                   |
| 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|
| 2 847 | 2 413 | 3 092 | 3 355 |

| **Payment of social insurance pension, billion rubles**       |
| 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|
| 3,9 | 3,0 | 3,7 | 3,9 |

| **Deficit** |
|-------------|
| - in billion rubles | 44.6 | 39.2 | 43.4 | 44.0 |

Source: own calculations based on data [12, 14].
The pension system deficit is caused by demographic factors, as well as high informal employment. Currently, about 15 million people (21.2% of the total number of workers) are employed in the shadow sector of the Russian economy [12].

5. Life expectancy after retirement

In Russia the average retirement age is 60.3 years for women and 63.2 years for men. Life expectancy after retirement is 17.6 years for women and 13.1 years for men [11]. At the same time, in OECD countries, women retire at an average of 63.6 years and men 65.1 years. The average number of expected retirement years is 22.5 years for women and 18.1 years for men. Thus, life expectancy after retirement in Russia is much lower for men and women compared to other countries.

The efficiency of the funded pension system can be assessed by the following indicators:

1. Replacement rate

In Russia, the replacement rate of the mandatory funded pension system is only 2% of the average earnings. A similar indicator for OECD countries averages 12.3% (e.g. in Iceland – 65.8%, Netherlands – 68.2%, Denmark – 71.6%) [11]. Voluntary pension provision allows increasing the replacement rate by another 8%, but it covers only about 7% of the working-age population. In OECD countries, where voluntary pensions are widespread, the replacement rate ranges from 12.7% in Germany to 38% in Ireland. In addition, the voluntary pension system covers from 12.3% of the working-age population of Estonia and up to 70.4% of the working-age population of Germany [11]. Voluntary pension provision is not developed in Russia due to such reasons as low income level, people's distrust of financial institutions and lack of financial literacy.

2. Rate of return of pension savings

Russia is significantly behind the OECD countries in terms of real average annual rate of return of private pension savings. Thus, for the five-year period (December 2011 to December 2016) the real average annual rate of return in Russia was -1.1%, while in most countries it was above 2%. The highest annual returns were observed in Canada (6.9%), Netherlands (6.7%) and Hungary (6.6%) [15, 16].

The real 5-year (2011-2015) average annual return of public pension reserve funds was higher than 1% for the countries surveyed by the OECD. The highest annual returns were observed in New Zealand (11.8%), Canada, CPPIB (10.3%) and Sweden, AP4 (9.2%) [17]. In Russia, the real average annual return of Vnesheconombank's expanded portfolio was at the level of -1.7% over the same period.

3. The investment of pension funds in infrastructure (as a % of total investments)

In Russia, pension funds can only invest in infrastructure by purchasing concession bonds. In 2016-2017, concession bonds accounted for only 1% of the total investment [18]. At the same time, the total investment in infrastructure at the end of 2015 amounted to 3.6% of the total assets of large pension funds and state pension reserve funds of the world, surveyed by the OECD. This indicator is higher in some pension funds: CBUS, HESTA and Hostplus (Australia) – 10.5%, 11.4% and 11.6%, respectively, PensionDanmark (Denmark) – 10.7%, OTPP (Canada) – 7.7% [17].

The scale of infrastructure investments of pension funds in Russia is insignificant (see Ошибка! Источник ссылки не найден.). In many countries, pension savings are comparable to or even higher than the country's GDP, while in Russia they account for only 6% of GDP.

4. Prospects of application of pension models in Russia

In our opinion, the future prospects of the Russian pension system should be connected with the preservation of a mixed model of pension provision, which generally corresponds to global trends. The mixed model reduces the risks inherent in both the PAYG pension system and the funded pension system.

According to the statistical projections to 2035, the trend of the ageing of the population of Russia will continue [12]. Accordingly, the deficit of the PAYG pension system will increase. There are three ways to reduce the deficit: 1) reduction of pension liabilities; 2) growth of the federal budget transfers; 3) growth of the total amount insurance contributions.
Pension liabilities can be reduced by increasing the retirement age, tightening of conditions for early retirement and pension indexation mechanisms, restrictions payment of pensions to working pensioners. These directions are implemented in most European countries. In Russia, many experts also suggest that retirement age should be raised [5]. However, actuarial calculations show that the effect of increasing the retirement age will be short-term. In the long-term period, pension liabilities will grow due to the additional period of employment [4]. The tightening of pension indexation mechanisms as well as the restrictions payment of pensions to working pensioners are also unacceptable in Russia due to the low size of pensions. In our opinion, the development of professional pension insurance is a promising direction for reducing the federal budget's liabilities on early pensions.

It is impossible to expect a further increase in budget transfers to the pension system in the conditions of the projected federal budget deficit. Therefore, we will consider the directions of increasing the total amount of insurance contributions. First of all, it is necessary to legalize the hidden salary. This will increase the income of the pension system by at least 10-15% or 400-600 billion rubles per year (0.5-0.75% of GDP) [7]. The issue of raising the wage limit, which is subject to insurance contributions at the rate of 22%, should also be considered.

The prospects of the country's funded pension system depend on the government's decision to maintain the mandatory funded pension. Unlike a voluntary pension, it provides the main inflow of funds into the funded pension system. In addition many people are not ready to save for their own pension and expect to receive a pension from the state [19]. Therefore, the mandatory funded pension must be maintained. However, corporate and personal voluntary pension insurance should also be developed.

The real return on pension savings is an important factor in determining the future of a funded pension. According to expert estimates, the area of positive real return of pension savings occurs when the inflation rate is not higher than 4.0-4.5% [20]. Inflation rate in Russia in 2017 was 2.52%. According to forecasts, it will not exceed 4% until 2030 [21]. This should have a positive impact on the return on pension savings in the future.

Worldwide, pension savings are an important source of infrastructure investment. Investments in infrastructure provide stable returns above inflation, as well as allow diversification of investment
portfolios of pension funds. On the other hand, the economy receives a long-term investment resource. In Russia, the potential volume of investments by participants of the pension market can reach 0.5 trillion rubles, including up to 350 billion rubles from private pension funds and 150-200 billion rubles from Vnesheconombank [18]. However, the potential of pension investments in infrastructure remains unrealized, primarily due to the high degree of regulation of this sphere.

5. Conclusion
Thus, both the PAYG pension system and the funded pension system have their advantages and disadvantages. Combining them into a mixed pension model can reduce their inherent risks and create a sustainable pension system.

In Russia, the mixed pension system has been created in accordance with global trends, but the effectiveness of its components is inferior to many countries.

The future prospects of the Russian pension system are related to ensuring the long-term stability of the PAYG pension system, as well as the preservation and development of the mandatory funded pension system. The long-term sustainability of the pension system is based on a dynamic economy, high employment, decent wages and an effective demographic policy. The development of the funded pension system can be achieved by increasing the overall welfare of the society, increasing financial literacy of the population, as well as creating conditions for the transformation of pension savings into a long-term investment resource of the country's economy.

6. References
[1] Roik V D 2015 Architecture of pension institutions in Russia: state and prospects Zhurnal NEA 3 184–188
[2] Mamiy E A, Novikov A V 2014 Actual problems of reforming the pension system of the Russian Federation Finansy i kredit 19 26–32
[3] Solovyov A K 2016 Retirement age as a tool of pension provision Finansy 8 53–57
[4] Solovyov A K To the question of raising the retirement age Finansy 6 58–64
[5] Kudrin A L, Gurvich E T 2012 The aging of the population and the threat of a fiscal crisis Voprosy ekonomiki 3 52–79
[6] Degtyar L S 2012 Pension reforms in developed countries: the latest trends and conclusions for Russia Problemy prognozirovaniya 2 101–112
[7] Pudovkin A V 2016 World experience in the use of mandatory and voluntary funded pension systems: lessons for Russia Vestnik MGIMO-Universiteta 3 258–264
[8] Fedotov A I 2006 History of pension systems in foreign countries Trudy ISA RAN 23 308–316
[9] Chybaltski F 2016 The Multidimensional adequacy and efficiency of European pension systems: the ranking and relationships In: Proceedings of the 15th International conference on finance and banking pp 128-139 Silesian University in Opava, School of business administration in Karvina (Prague Czech, Republic)
[10] Borella M, Fornero E 2009 Adequacy of pension systems in Europe: an analysis based on comprehensive replacement rates ENEPRI research report 68
[11] OECD: Pensions at a Glance 2017: OECD and G20 Indicators, OECD Publishing, Paris. http://dx.doi.org/10.1787/pension_glance-2017-en
[12] Russian Federal State Statistics Service http://www.gks.ru
[13] To save the funded pension system, http://www.sberbank.ru/common/img/uploaded/analytics/2015/Nakopitelnaya_pensiya.pdf
[14] Federal Treasury of the Russian Federation http://www.roskazna.ru
[15] Pension savings of Russia. Results of 2016 and interim results of 2017 http://p-a-c.ru/124237
[16] OECD: Pension Markets in Focus 2017, OECD, Paris www.oecd.org/pensions/private-pensions/Pension-Marketsin-Focus-2017.pdf
[17] OECD: Survey of Large Pension Funds and Public Pension Reserve Funds 2016
www.oecd.org/finance/survey-large-pension-funds.htm

[18] On the state and directions of development of the market of long-term investments in the infrastructure of Russia, http://www.cbr.ru/Content/Document/File/41212/analytics_note_

[19] 16042018.pdf

[20] Russian Public Opinion Research Center https://wciom.ru,

[21] Abramov A, Radygin A, Chernova M, Aksenteva K 2015 The effectiveness of pension management: theoretical approaches and empirical analysis Voprosy ekonomiki 7 26–44

[22] Long-term forecast of socio-economic development of the Russian Federation up to 2030 http://static.government.ru/media/files/41d457592e04b76338b7.pdf