

Breakthrough strategies for sustainable socio-economic development of enterprises and economy in Russia

Evgeniy V. Kostyrin (0000-0003-2569-1146)¹, **Evgeniy V. Sokolov** (0000-0001-7736-7853)¹, **Tatyana V. Volokhova** (0000-0002-7456-7486)¹

¹ Bauman Moscow State Technical University (National Research University), Moscow, Russia

Abstract. The developed in this article breakthrough strategies for sustainable socio-economic development of enterprises and the economy of the Russian Federation allow to meet the following expectations at quite achievable rates of enterprises revenue growth by 3% per year: 1) ensure the growth of wages for working citizens by 34% over 5 years at quite achievable rates of enterprises revenue growth by 3% per year, which will practically end poverty; 2) increase contributions to the development fund by 16% over 5 years. Almost 4 trillion rubles will accumulate already in the first year of implementation during the transition to social financial technologies on pension and medical accounts of the Russian Federation citizens, and 74 trillion rubles will have been accumulating by 2026.

Keywords: Economic and mathematical model · Russian economy · Social contributions · Working citizen · Welfare state.

1. Introduction

Modern strategies of sustainable socio-economic development of enterprises and economy, currently existing in the Russian Federation, do not motivate citizens of working age to increase productivity and labor efficiency, since there is no clear and transparent mechanism for the formation and use of social funds, which are replenished at the expense of employees and products manufactured at enterprises, i.e., ultimately, as a result of enterprises employees labor. So, there is no objective mechanism for calculating pensions in the pension system, it is not clear how the pension coefficient is formed, why, in particular, it depends on the length of service and does not depend on the amount of contributions to the Pension Fund of the Russian Federation (PFR), how it changes in the case of continued employment after retirement age, how to dispose of income from investing pension funds in the economy of the Russian Federation (Kostyrin and Sokolov, 2022). The existing system of medical organizations financing does not motivate patients to take a responsible approach neither to the preservation of their health, nor to the rational use of funds allocated for their medical care (Kostyrin, 2020).

Analysis of Russian and foreign researchers scientific works devoted to the problems of social contributions, primarily pension contributions and to the Federal Compulsory Medical Insurance Fund (FFOMS), and socio-economic development (Shirokikh, 2019; Bouchet et al., 2017; Gao et al., 2018;

¹ Corresponding author: kostyrinev@bmstu.ru

Pereira and Marques, 2022; Ratushnyak et al., 2019; Ustymenko et al., 2021; Vlasov et al., 2019), revealed that most researchers pay too much attention to the legal aspects of this problem, leaving without a deep analysis the economic and mathematical apparatus for the formation of optimal parameters and values of social contributions, in particular, retirement and medical care, and the factors affecting them. The work (Gao et al., 2018) models the impact of health and education benefits on the estimated size, structure and redistribution of the Chinese social security system, however, economic and mathematical models, mathematical and instrumental methods for determining optimal and scientifically justified amounts of deductions for health care, medical care and pension provision of citizens are not considered. Articles (Kostyrin and Sokolov, 2022; Kostyrin et al., 2019) prove the advantage of the methodology for financing an old-age labor pension based on contributions to personalized pension accounts in comparison with the existing pension provision in the Russian Federation.

Huge number of works is aimed at finding effective mechanisms for financing healthcare (Kadyrov, 2021; Latukha, 2018; Edeleva et al., 2018).

Paper (Baranovskaya, 2018) examines in detail the problems of building optimal organizational management structures for both large corporations and individual small business organizations, which is of particular interest for solving social problems and challenges faced by the domestic economy. Some of her works are also devoted to the influence of ecology on the quality of human life. However, first of all, Baranovskaya investigates the dependence of life quality on food and the development level of Russian agro-industrial complex.

In (Egorova and Sorokina, 2019) special attention is paid to the problems of coordinating the interests of public-private partnership entities and the tasks of multi-level management using expert assessment methods, simulation modeling.

Foreign researchers (Choi et al., 2017) consider in their work the impact of products volume and services provided on the economic efficiency and profitability of the enterprise.

Attention is paid to effective mechanisms for managing organizations and stimulating the employees' efficiency in the work (Kaneva et al., 2018); however, the sphere of scientific interests is limited to the introduction of new resource-saving technologies and automated information systems into the practical activities of enterprises and organizations.

The system of domestic healthcare effective financing and the analysis of employees' deductions to the FFOMS are paid attention in the work (Kuznetsov et al., 2020), but the emphasis of this work is the development of personalized medicine, digital medicine and neural networks.

Thus, the literature review showed the absence of a unified theoretical and methodological approach to the creation of mathematical models for the processes of managing employees' social contributions in the Russian Federation, *which determines the relevance of the research topic*. Mathematical modeling of social financial technologies for the development of enterprises and economy in Russia using personalized pension accounts and medical savings accounts (MSAs) also presents a scientific and practical problem.

The purpose of this study is to develop a breakthrough strategy for the socio-economic development of enterprises and the economy in the Russian Federation, including an economic and mathematical model, algorithm and tools, allowing to achieve in practice motivation of personnel to increase labor productivity and solving problems of socio-economic development for the economy of the Russian Federation.

2. Materials and Methods

The economic and mathematical model of social financing complex system for enterprises and economy in Russia has the following form:

Target function

$$WA = I \cdot \theta_{\sigma} + \xi \cdot (FR - FR_b) \rightarrow \max, \quad (1)$$

limitations

$$D_{PFR} = WA \cdot \varphi_{PFR} + (I - C_{var}) \cdot T_{VAT} \tag{2}$$

$$D_{FFOMS} = WA \cdot \varphi_{FFOMS} + WA \cdot T_{incomepers.} + FR \cdot T_{incomecorp.} \tag{3}$$

$$\varphi_{FFOMS} = \varphi_{FFOMS5,1\%} - \Delta\varphi_{FFOMSincent.} - \Delta\varphi_{FFOMSprime.} \tag{4}$$

$$\varphi_{PFR} = \varphi_{PFR22,0\%} - \Delta\varphi_{PFRincent.} - \Delta\varphi_{PFR_{VAT}} \tag{5}$$

In the economic and mathematical model (1)-(5), the following abbreviations are used: WA – the amount of employees’ wages, RUB; I – income of enterprises from the sale of goods, products, works, services, RUB; ξ – the coefficient of the financial result increase redistribution between employees and owners of enterprises; θ_6 – the percentage of income allocated to increase the employees’ wages, in the basic version; V – sales volume of goods, products, works, services by enterprises, units; C_{var} – conditionally variable costs of enterprises in the sale of goods, products, works, services, RUB; D_{PFR} – the amount of the enterprise’s deductions to the PFR and in the form of value added tax (T_{vat}), RUB; D_{FFOMS} – the amount of the enterprise’s deductions to the FFOMS in the form of personal income tax ($T_{incomepers.}$) and corporate income tax ($T_{incomecorp.}$), RUB; φ_{PFR} – the rate of deductions to the PFR, taking into account the growth of incentives for employees and reducing the cost of goods, products, works, services sold, %; $\varphi_{PFR22,0\%}$ – the rate of deductions to the PFR for the basic version of the modeling, equal to 22.0% of the wage fund, %; $\Delta\varphi_{PFRincent.}$ – reduction of deductions rate to the PFR due to the growth of incentives for employees, %; $\Delta\varphi_{PFR_{VAT}}$ – reduction of deductions rate to the PFR due to the growth of VAT, %; φ_{FFOMS} – the rate of deductions to the FFOMS, taking into account the growth of incentives for employees and reducing the cost of goods, products, works, services sold, %; $\varphi_{FFOMS5,1\%}$ – the rate of deductions to the FFOMS for the basic version of the modeling, equal to 5.1% of the wage fund, %; $\Delta\varphi_{FFOMSincent.}$ – reduction of deductions rate to the FFOMS due to the growth of incentives for employees, %; $\Delta\varphi_{FFOMSprime.}$ – reduction of deduction rate to the FFOMS due to the effect of prime cost reduction, %; FR – the financial result of enterprises from the sale of goods, products, works, services, RUB; FR_b – the financial result of enterprises from the sale of goods, products, works, services in the basic version, RUB.

3. Results

The results of modeling using the economic and mathematical model (1)-(5) are presented in Table 1.

Table 1. Modeling results for an employee in Russia. *Source:* Compiled by the authors.

1	2	3	4	5	6	7	8	9	10	11
2021	116604	105060	63036	42024	52355	22%	5%	26434	11785	38219
2022	120102	106321	63036	43285	55716	20%	3,9%	26434	11785	38219
2023	123705	107619	63036	44583	59177	18%	2,8%	26434	11785	38219
2024	127416	108957	63036	45921	62742	16%	1,8%	26434	11785	38219
2070	496290	241899	63036	178863	41711 3	0%	0%	63485	64305	127790
2071	511179	247265	63036	184229	43141 6	0%	0%	65390	66469	131859

1. Year
2. Average monthly revenue of enterprises per employee with a share of wages in its structure of 44,9% in the basic version, RUB.

3. Average monthly cost of goods, products, works, services sold per employee at profitability of 9,9% in the basic version, RUB.
4. Conditionally fixed costs with their share in the cost structure, of 60% in the basic version, RUB.
5. Conditionally variable costs with their share in the cost structure, of 40% in the basic version, RUB.
6. Average monthly wage, RUB.
7. Rate of deductions to the PFR
8. Rate of deductions to the FFOMS
9. Amount of monthly contributions to the PFR and VAT, RUB.
10. Amount of monthly contributions to the FFOMS, personal and corporate income tax, RUB.
11. Amount of monthly contributions to the PFR, contributions to the FFOMS, VAT, personal and corporate income tax, RUB.

This article proposes a mechanism of state regulation that encourages enterprises to increase wages, which consists in reducing pension contributions and deductions to the FFOMS, depending on wage growth, but at the same time does not allow a reduction in the basic amount of deductions for VAT, pension provision, personal and corporate income tax and deductions to the FFOMS.

4. Discussion

The economic effect of an annual increase in the revenue of enterprises by 3.0% is shown in Table 2.

Table 2. The economic effect of the annual increase in the revenue of enterprises by 3.0 %. *Source:* Compiled by the authors.

Year	Average monthly revenue of enterprises per employee, RUB	Average monthly salary, RUB	The rate of deductions to the PFR	The rate of deductions to the FFOMS
1	2	3	4	5
2021	116603	52355	22,00%	5,1%
2022	120102	55716	19,9%	3,9%
2023	123705	59177	17,9%	2,8%
2024	127416	62742	16,2%	1,8%
2025	131238	66414	14,5%	0,8%
2026	135175	70197	13,0%	0,0%

The reduction of deductions rate to the Pension Fund of Russia (PFR) to 13.02% and deductions rate to the Federal Compulsory Medical Insurance Fund (FFOMS) to 0% over 5 years for workers with average wages who started working in 2021 is an important result of social financial technologies use.

5. Conclusion

The proposed strategies for financing enterprises and the Russian economy provide the following opportunities:

- 1) To ensure the growth of wages for employees by 34% over 5 years at quite achievable rates of enterprises revenue growth by 3% per year, which will practically end poverty.
- 2) To ensure the level of pension provision in the amount of 40% of wages in 4 years; 60% – in 8 years; 80% – in 10 years.
- 3) Increase contributions to the development fund by 16% over 5 years while reducing social contributions (The Pension Fund of Russia and the Federal Compulsory Medical Insurance Fund by 14.08%).

4) Almost 4 trillion rubles will accumulate already in the first year of implementation during the transition to social financial technologies on pension and medical accounts of the Russian Federation citizens, and 74 trillion rubles will have been accumulating by 2026.

References

1. T.P. Baranovskaya, V.I. Loiko, A.E. Vostroknutov, *Mod. Econ.: Probl. Sol.* **11(107)**, 84-97 (2018). <https://doi.org/10.17308/meps.2019.11/2004>
2. T.P. Baranovskaya, V.I. Loiko, A.E. Vostroknutov, I.M. Yakhontova, *Bul. Voronezh State Agrarian Univ.* **3(58)**, 210-218 (2018). <https://doi.org/10.17238/issn2071-2243.2018.3.210>
3. F.N. Kadyrov, *Health Care Manager* **6**, 80 (2021). <https://doi.org/10.21045/1811-0185-2021-6-80>
4. D.A. Kaneva, A.V. Breusov, V.V. Kharchenko, *Bul. New Med. Techn.* **4**, 123-131 (2018). <https://doi.org/10.24411/2075-4094-2018-16197>
5. P.P. Kuznetsov, E.P. Kakorina, A.A. Almazov, *Therapist* **1**, 48-53 (2020). <https://doi.org/10.33920/MED-12-2001-06>
6. O.A. Latukha, *Bul. Novosibirsk State Pedag. Univ.* **8(3)**, 225-236 (2018). <https://doi.org/10.15293/2226-3365.1803.16>
7. O.A. Latukha, *Bul. Novosibirsk State Pedag. Univ.* **8(1)**, 239-254 (2018). <https://doi.org/10.15293/2226-3365.1801.15>
8. Federalnaya sluzhba gosudarstvennoi statistiki (Rosstat) [The Federal Service for State Statistics (Rosstat)] Accessed on: October 25, 2022. [Online]. Available: <https://rosstat.gov.ru/>
9. S.V. Shirokikh, *Soc.-Econ. Huma. J. Krasnoyarsk State Agrarian Univ.* **1(11)**, 133-143 (2019). Accessed on: October 25, 2022. [Online]. Available: <http://www.kgau.ru/social/content/11/content/12.pdf>
10. A.N. Edeleva, V.I. Starodubov, M.A. Fedotkin, T.P. Sabgaida, V.G. Zaporozhchenko, *Soc. Aspects Pub. Health* **2(60)**, 2 (2018). <https://doi.org/10.21045/2071-5021-2018-60-2-2>
11. M. Bouchet, L. Marchiori, O. Pierrard, *J. Pension Econ. Fin.* **16(2)**, 173-204 (2017). <https://doi.org/10.1017/S1474747215000451>
12. N. Egorova, Ya. Sorokina, *Decision Making Model for Outsourcing by Analysis of Hierarchies of T. Saaty Under Fuzzy Environment*, in A. Abraham, S. Kovalev, V. Tarassov, V. Snasel, A. Sukhanov (eds.), *Proceedings of the Third International Scientific Conference "Intelligent Information Technologies for Industry" Advances in Intelligent Systems and Computing*, **874**, 280-289 (Springer, Cham, 2019). https://doi.org/10.1007/978-3-030-01818-4_28
13. Q. Gao, Y. Zhang, S. Yang, S. Li, *Soc. Pol. Soc.* **17(2)**, 227-244 (2018). <https://doi.org/10.1017/S1474746417000100>
14. J.H. Choi, I. Park, I. Jung, A. Dey, *Health Care Manag. Sci.* **20**, 221-231 (2017). <https://doi.org/10.1007/s10729-015-9348-9>
15. E.V. Kostyrin, *Indust. Eng. Manag. Syst.* **19(3)**, 716-729 (2020). <https://doi.org/10.7232/iems.2020.19.3.716>
16. E.V. Kostyrin, E.V. Sokolov, *Breakthrough Technologies for Socio-economic Development of Russia Based on Personalized Pension Accounts*, in P.V. Trifonov, M.V. Charaeva (eds.) *Strategies and Trends in Organizational and Project Management. Lecture Notes in Networks and Systems*, **380**, 249-255 (Springer, Cham, 2022). https://doi.org/10.1007/978-3-030-94245-8_34
17. E.V. Kostyrin, E.V. Sokolov, V.V. Zozulya, *Int. J. Supply Chain Manag.* **8(3)**, 321-333 (2019). Accessed on: October 25, 2022. [Online]. Available: <https://ojs.excelingtech.co.uk/index.php/IJSCM/article/view/3200>
18. M.A. Pereira, R.C. Marques, *World Devel.* **149**, 105708 (2022). <https://doi.org/10.1016/j.worlddev.2021.105708>
19. S. Ratushnyak, P.H.M. van Baal, M. Hoogendoorn, *Amer. J. Prevent. Med.* **6(57)**, 792-799 (2019). <https://doi.org/10.1016/j.amepre.2019.07.027>

20. V. Ustymenko, A. Soshnykov, A. Tokarska, O. Makarenko, K. Nesterenko, Georg. Med. News **3(312)**, 157-163 (2021). Accessed on: October 25, 2022. [Online]. Available: <https://www.geomednews.com/v312-march-2021.html>
21. V.V. Vlasov, S.V. Shishkin, A.E. Chirikova, A.V. Vlasova, J. Med. Law Ethics **3**, 231-240 (2019). <https://doi.org/10.7590/221354020X15815920230924>