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## Pension System as Wellbeing Institute

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### Abstract

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The article proves that it is possible to achieve wellbeing if there is an improvement of both the pension system and change in the citizen's attitude towards retirement income. The calculations (dynamics of the percentage of the working retirees, both in Russia and TPU, and the average salary) show that the increase in the ratio of the number of retirees and working people can't lead to the deficit of the budget of the Russian Pension Fund. It is proved that the key way to overcome the deficit is to remove payments, which are not or little connected with earned income (disability and loss of a breadwinner pension, long service pension, and early retirement pension) and save only one function – compensation for loss of earnings. Refusal of the territorial rent (pension's peg to the minimum of subsistence of a retiree in the region) will also balance the financial state of the Pension Fund. It is mathematically proved that the wellbeing of retirees can be reached if they participate in the compulsory and voluntary pension insurance programs, which are not necessary governmental.

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**Keywords:** Wellbeing, social state, pension fund deficit, pension system management.

### 1. Introduction

In Russia during the last three years pension savings of citizens were “frozen”. There was no pension indexation for the working retirees in 2016. The reason for that is the deficit of the Pension Fund, resulted by the increasing of the ratio of retirees and working people.

Since 1981 the global bank makes an assessment of the ratio of the number of retirees and working people on a regular basis (World Bank indicators, 2016). At the beginning of the nineties a global



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research of the problems of population aging and pension support was conducted under the bank auspices. These problems were caused by the progressive growth of the life expectancy (in terms of «birth» and «endowment period»). In Russia in 2010 the endowment period was 14, 3 years for 60 years old men and 23, 9 years for 55 years old women (World Bank Policy Research Report, 1994); the ratio of the number of working people and retirees has increased from 18% in 2011 to 19% in 2014. In the in 2013 the expected endowment period was 18 years for men and 20, 5 years for women [The Annual USA report, 2014]. In technologically developed countries life expectancy at birth has increased by 2 years over the decade and by 1 year for 65 years old (Dormont B. and all, 2011).

All these have led to the growth of the percentage of senior citizens and population itself, and what's important, working-age population. There is an increase of pressure on national budgets, especially in social-oriented countries, and pension systems, most of which are joint and based on a «pay-as-you-go» principle. In Russia the strategic goals are: providing a socially accepted level of pensions; reaching a long-term financial stability and balance of the Pension Fund budget, suitable for current economic development; conforming to international standards (Long-term development strategy, 2012). During 2013-2016 (according to a forecast) the Pension Fund deficit may increase by 32 times, from 9, 84 to 317, 54 billion rubbles (The Russian's Pension Fund budget, 2015).

The problem of the Pension Fund deficit is becoming more popular not only in Russia (Searching for a new silver age in Russia, 2015), but also in many other countries. The need to overcome the deficit of the Pension and Insurance Fund is a part of Greece government plan, where the Prime Minister stated that the pension reform is needed, because otherwise «we wouldn't be able to pay pensions in 5 years» (Melnic G., 2016). In China, thanks to its' Constitution, there is an inability of the pension fund deficit [13]. In the USA in 2013 retirement and loss of a bread-winner payments were 672, 1 billion \$, whereas in payments were 620,8 billion \$, so the deficit was 51,3 billion \$ (7,6%). In 2000 there was a surplus (in payments = 433 billion \$, payments = 352, 7 billion \$). The same situation took place in the Disability Insurance Fund. In 2013 the deficit was 34, 7 billion (28, 4%). To solve this problem two funds of social insurance should become off-budget, while Medicare should remain budget (The USA Annual report, 2014).

Decrease of the budget pressure is declared as the aim of the pension system reform carried out in many countries. But there are other, such as rational for providing longer, happier life; reservation of pension rights; providing enough pension payments when retire (Developing a funded pension system in Russia, 2013). Although, there is no international standard of wellbeing conditions for the retirees (Global Age Wath Index 2015). As for Russia there are almost apocalyptic scenario: all the National Wellbeing Fund (NWF) resources will be enough to finance the deficit of the Pension Fund only for one year (Searching for a new silver age in Russia, 2015).

That's why it is important to answer the following questions:

- What is the reason for the deficit of the pension system? Are these management, economic (workforce productivity, inflation, low salary, off-the-books employment), social (poverty control, pension formula) or demographic (changing in the ratio of pension recipients and insured people, for who insurance payments are being made) factors?
- How effective are pensions formed and spent (in the interest of current or future retirees)?

- Should citizens care about providing a decent life when they retire by themselves? Or should government do it?

## **2. Methodology and Data**

An insurance principle of labour pension financing (personified recognition of the insurance in payments during an employee's work life) means that the size of a pension should be determined by the aggregate value of insurance in payments to the Pension Fund of the Russian Federation. The assessment of the model and the level of savings in the working age population and the progress expenses in the elderly population may provide advanced understanding of how management of the Pension Fund impacts on its financial status and pensioner's wellbeing. Let's use the following data of the two management levels to assess the effect of the Pension Fund management on the financial status (surplus/shortage/balance) of the Pension Fund. These data are:

- countries (data of the Unified Interdepartmental Statistical Information System, the Pension Fund of the Russian Federation),
- particular insuring party (in our case, Tomsk Polytechnic University).
  - The following data will be used in the calculations:
  - inflation rate, as the value of one pension factor annually increases by the index of the customer cost growth for the last year from the 1st of February and can't be below this index from the 1st of April (Russian Federal Law 28.12.2013 N 400-FL);
  - notional pension capital – is the total amount of the insurance in payments and other incomes to the Pension Fund of the Russian Federation, which forms the basis for determining the size of the PAYG (pay-as-you-go) component of the labour pension;
  - pension insurance record – is the total length of work period and (or) another activity, during which insurance in payments were paid to the Pension Fund, and other periods, also included in the pension insurance record, that are taken into consideration while determining the right for the labour pension;
  - expected period of an old-age retirement pension payment – is a factor, calculated on the basis of the federal executive body for statistics and used for the determination of the PAYG and funded component of the retirement pension.

As the rate of the insured pension account is a function of:

- a refinancing rate (1) (we can assume that: the income rate can't be below the refinancing rate, the rate of the tariff of the fund contributions and the number of years of membership in the fund are given values.),
- an earned income (2) and
- an inflation rate (3).

We can predict the influence of these factors on the possible pension rate. We will use the least square method to find an unknown index by using Microsoft Excel 2016. The time series will be from 2006 to 2015 (inflation – from 1993), as we have all the data; the forecast period will be from 2016 to 2050; a,b are unknown factors and we will use the trend form, as it visually describes data most correctly. We will use the data from Rosstat (Russian Federal State Statistics Service) (table 1).

**Table 1.** Factors, that influence financial status of the Pension system of the Russian Federation.

Year	Refinancing rate[34]	Average salary[33]	Inflation [18]
1993			840
1994			214,8
1995			131,6
1996			21,8
1997			11
1998			84,5
1999			36,6
2000			20,1
2001			18,8
2002			15,06
2003			11,99
2004			11,74
2005			10,91
2006	11,5	10634	9
2007	11	13593	11,87
2008	10,75	17290	13,28
2009	10,975	18638	8,8
2010	8,25	20952	8,78
2011	8	23369	6,1
2012	8,125	26629	6,58
2013	8,25	29792	6,45
2014	8,25	32495	11,36
2015	8,25	33158	12,9

1. Let X be the year and Y be the refinancing rate. According to the visual analysis of the regression field, we can assume, that the refinancing rate (Y) depends on the year (X) and is calculated by the following formula (regression model):

$$Y = ae^{bX}$$

(1)

As a result, we will have estimated coefficients:  $a = 2E+39$ ,  $b = -0,044$ . With that, determination coefficient equals  $R^2 = 0,73$ , which indicates an average quality of the model. The trend shape is an exponential curve (figure 1).

2. Let X is the year and Y is the average monthly nominal salary. According to the visual analysis of the regression field, we can assume, that the average monthly nominal salary (Y) depends on the year (X) and can be described by the following regression model:

$$Y = aX + b$$

(2)

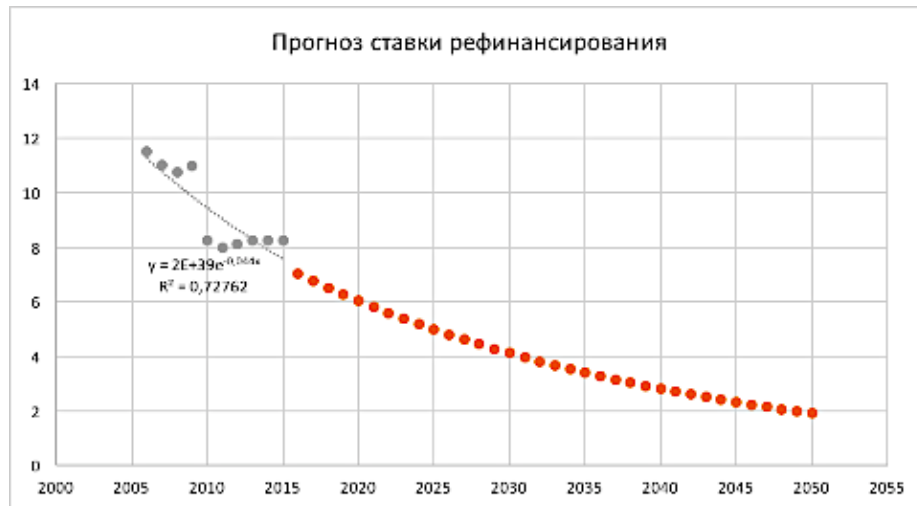


Fig. 1. Forecast of the refinancing rate.

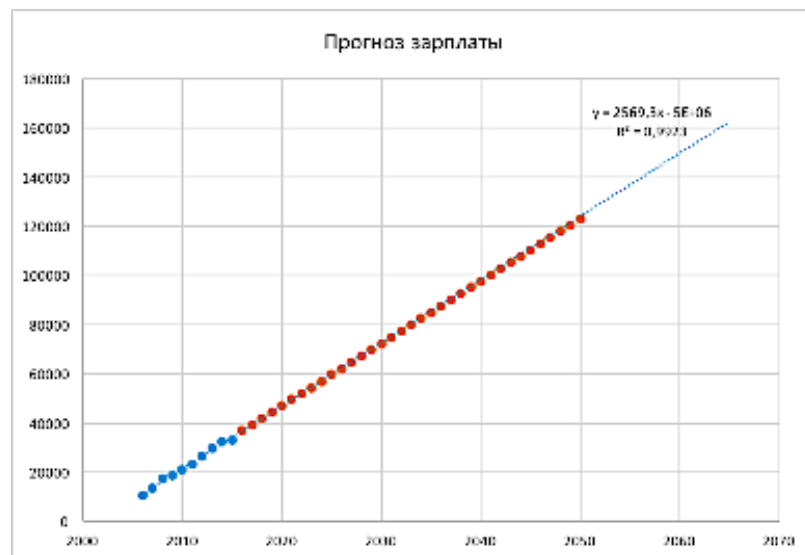


Fig. 2. Forecast of the monthly nominal salary.

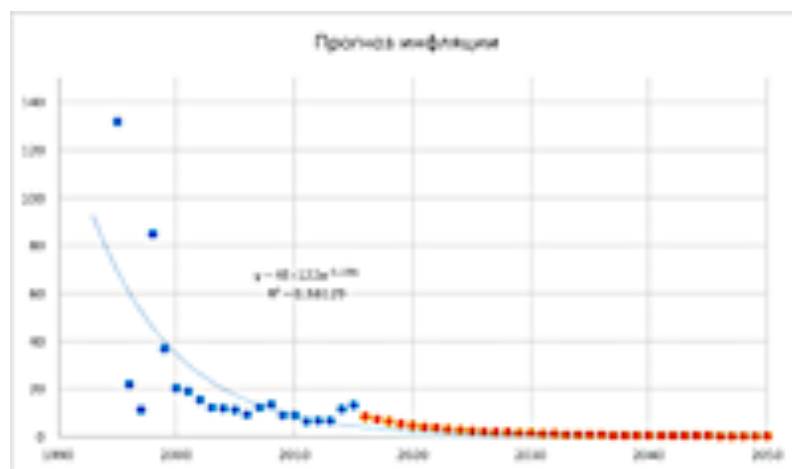


Fig. 3. Forecast of the inflation

As a result, we will have estimated coefficients:  $a = 2569,3$   $b = 5E+6$ . The trend shape is a linear curve. The determination coefficient equals  $R^2 = 0,99$ , which says about the high quality of the regression model (picture 2).

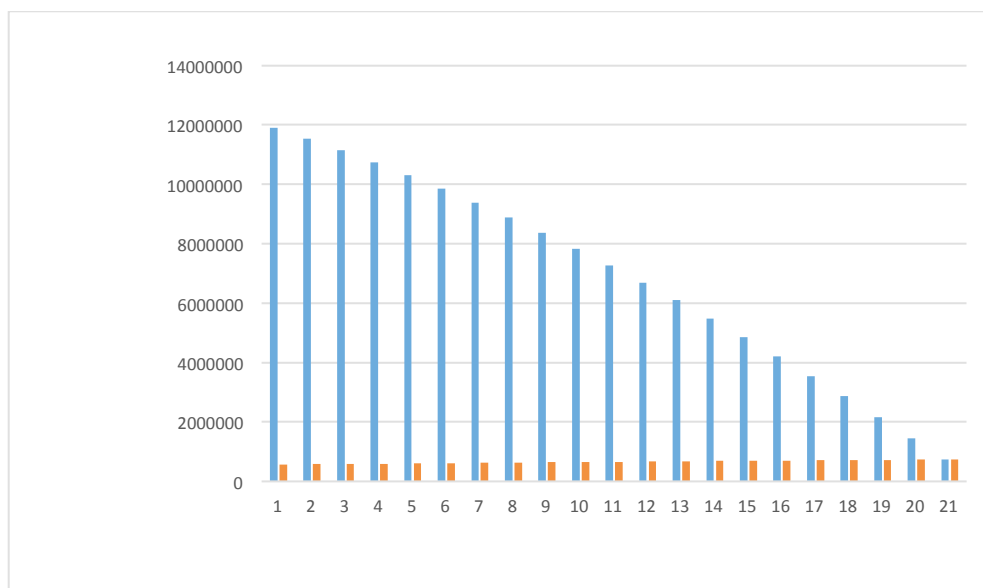
3. Let  $X$  is the year and  $Y$  is the inflation. According to the visual analysis of the regression field, we can assume, that the inflation ( $Y$ ) depends on the year ( $X$ ) and can be calculated by the formula (regression model):

$$Y = ae^{bX}$$

(3)

As a result, we will have estimated coefficients:  $a = 4E+122$   $b = -0,139$ . The trend shape is an exponential curve. The determination coefficient equals  $R^2 = 0,58$ , which says about the average quality of the regression model (picture 3).

Using the regression models, let's describe a hypothetical situation of individual pension account expenditure, when work experience equals 34 years, the beginning of work activity is in 2016, in payments to the Pension Fund are at the rate of 22%, endowment period equals 21 years. It is assumed that the inflation rate, the refinancing rate and the average salary will change according to the regression models. The amount of the individual account will be 11 890 656, 79 rubbles for 34 years (by 2050). We assume, that the expenditure can be described by the diagram (figure 4). Blue column for each year is the individual account balance, red one is the amount of money, paid for the relevant year.



**Fig. 4.**Expenditure of the individual pension account.

The calculations prove that with these regression models there can't be any budget deficit.

Let's examine the data of TPU for the period of 2009-2015 to prove that the stable number of working retirees and the amount of average income, approximately equal to the regional level, should not create a burden for the Pension Fund (table 2).

**Table 2.** Factors, influencing the financial condition of the pension system in Russia. Contribution of TPU\*

Year	Average salary, rubles per month		Salary ratio (TPU to region), %%	Total number of staff, people	Percentage of retirement age employees, %%
	TPU	Tomsk region			
2009	19392,04	19634,8	98,76	6 148,00	0,26
2010	19932,78	21126,9	94,35	7 134,00	0,27
2011	22888,94	24000	95,37	7 433,00	0,27
2012	24643,49	27376	90,02	7 564,00	0,26
2013	30770,67	29 692	103,63	7 486,00	0,27
2014	32851,38	33000,00	99,55	7 731,00	0,26
2015	32903,23	31727	103,71	7 753,00	0,26

\* Source: calculated by the authors, according to the accounting records of Tomsk Polytechnic University

The percentage of the retirement age employees is stable and equals 26-27%. In Russia the percentage of working retirees was 23% in 2011 and 22, 3% in 2014 (Duration of work experience, 2011, 2014). Thus, every fourth retiree supports himself. The ratio of working population and retirees should not be the reason for the deficit, as their payments continue to arrive to the Pension Fund.

### 3. Discussion

We will use the basis of the definition of ‘How’s life’ (How Was Life? Global Well-being since 1820, 2014) and our previous publications (Eremina S.L. at all, 2015, Kudelina O. at all, 2015, Eremina S.L. at all, 2015) to understand and rate “wellbeing”. Within a framework of this research we talk about material wealth, such as maintaining living standards, which depends on the financial condition of the pension system and the individual efforts. Although, the modern conception of wellbeing takes into consideration psychological rather than material (Sen A. The Quality of Life, 1993) needs and motives (such as self realization, social status and so on).

The understanding of the ‘age’ timeline changes as a result of the growth of the average life expectancy. Now assessment of potential problems and possibilities of longer lifetime are only appearing. Life-cycle hypothesis (Modigliani F. Brumberg R., 1954) states that people smooth down their consumption by collecting assets during their working life and then spending it in the elderly age. One of the main missions of social insurance (Pestieau P. (2006), Feldstein M. (2005). Bonoli G. (2003). Hindriks J. at all (2003)) is a redistribution of income during lifetime, for example, by reducing disposable income from employment by the amount of insurance payments or by increasing disposable income during unemployment by the amount of insurance payments.

A lot of papers (Lee R., 2009; Pensions at a Glance, 2011) are devoted to the assessment of population aging on economic growth and government debt, which is assumed to increase to 585% of GDP [35] by 2050, although it is only correcting case of the lack of changes in individual behaviour or state policy (Searching for a new silver age in Russia, 2015). The problem of whether the elderly wellbeing is a state priority (Burns M.J., 2014, Siniavskaya O., 2010) is also widely discussed. Total savings will decrease with the growth of the senior citizens rate (Searching for a new silver age in Russia, 2015). That’s why we need special methods of developing and regulating the funded pension system (Developing a funded pension system in Russia, 2013) as a part of social safety net.

Depending on the purpose of organization and the source of funding, we can distinguish three models of the pension system (table 3) (Pension system's models).

**Table 3.** Models of pension system.

Pension system model	Pension system purpose	Pay-as-you-go pension [35]	Funded pension
Social state	Poverty control – the minimum standard of financial security for retirees should not be below minimum subsistence for retirees in a constituent entity of the Russian Federation	V	
Compulsory pension insurance	Group insurance of the risk of loss of the standard of living, people have in the working age	V	V
Individual voluntary insurance	Saving enough money to live when retire, which is one of the main ways of self-protection of workers and small businessmen		V

In distributive system senior citizen's well-being depends mainly on the state of economy and federal budget. And it can be different. Even in arguably fat years, distributive pension system wasn't capable of providing an adequate standard of living. An average pension barely reaches the third part of an average salary countrywide (Hmelev M., 2014), not drawing to the 40% of salary level claimed as the standard. In Russia over a period of 1991-2015 different ratio between the average salary and the average pension was recorded which depended on inflation compensation rate. If pension indexation was in advance, the gap reduced. If wages adjusted according to index, the gap increased.

Analysis of the financial condition of the pension system requires the assessment of income and outcome budget items of the Pension Fund.

In Russia during 2000-s several pension system reforms were conducted which led to numerous changes in the tariff rate. It reflects industry (extra-duty assignments, usually harmful conditions) and territorial (cold weather conditions) characteristics as well as year of birth. Besides, the payroll basis of pension payments was also changing. It consisted of the assessment of the 'pension insurance record' and the annual salary which every year adjusted according to the index (table 4).

**Table 4.** The maximum value base for insurance payment accounting on compulsory social insurance in case of temporary disability, paid to Social Insurance Fund of the Russian Federation (Russian Federation Federal Law 15.12.2001 N 167-FL)

Year	Base indexation coefficient (from the 1st January of the relevant year)	Base for insurance payment accounting with consideration of the indexation (for each private individual), rub.	Foundation – RF Government Regulation from
2016	1,072	718 000	26.11.2015 N 1265
2015	1,073	670 000	04.12.2014 N 1316
2014	1,098	624 000	30.11.2013 N 1101
2013	1,11	568 000	10.12.2012 N 1276
2012	1,1048	512 000	24.11.2011 N 974
2011	1,1164	463 000	27.11.2010 N 933
2010	Not established	415 000	Part 4 and 5 of the 8th Federal Law from 24.07.2009 N 212-ФЗ

Let's start with the income of the Pension Fund of the Russian Federation. Here we can distinguish actual income and income as the result of cost savings. According to the insurance model of the



pension formation, the main income source of the Pension Fund is the contributions of the employers and investment income, and in case of deficiency - subsidies from the state budget. The income of the Fund is a function of a tariff wage fund and it varies depending on the year of birth. The year 1967 is considered to be a starting point in Russia (table 5).

**Table 5.** Insurance payments rating (Russian Federation Federal Law 15.12.2001 N 167-FL)

Rate of insurance for people born in 1967 and later, %%	for funded pension financing			
	for the pension financing			
	Insurance	Funded	Insurance	Funded
Kate of insurance for people born in 1966 and earlier	0,0		6,0	
26,0 – for insurance pension financing, including:	26,0, where:		20,0, where:	
10,0 – joint part		0,0 - individual part	10,0 - joint part	6,0 - individual part
16,0 – individual part			10,0 - individual part	

Now let's talk about what can and reduces the expenses of the Fund.

They can be reduced by at least 35% by controlling an endowment period of those who was born before 1967 (Age survival, 2015). For example, a citizen retires in 2013. We will use the formula of the monthly pension calculations (precisely, the insurance part of the old age retirement pension):

$$P = \frac{PC}{T} + B$$

(4)

where, PC-pension capital, 'earned' by the citizen during his work life; B-fixed basic amount of the insurance part of the old age retirement pension; T-number of months of the expected period of labour retirement pension payments - the endowment period, which was 19 years (228 months) in 2013 and beginning in 01.01.2014 is 21 years (252 months). The longer the endowment period is, the smaller the monthly pension is. According to Goskomstat the real lifetime after retirement is 4-6 years for men and 17-18 years for women. Taking into consideration the gender difference, we can assume that the average lifetime is 12 years. Now we will calculate the amount of monthly pension at different endowment periods. If B=3610.31 rubbles and pension capital=1 200 000 rubbles, then in case of endowment period of 12 years (taken by Rosstat data) the pension will be 11 944 rubbles. If the endowment period is 228 months, the pension will be only 8 873 rubbles (8 372 rubbles if the endowment period is 252 months). So the difference is 3 071 rubbles or 35%. If we take into consideration 2 million new senior citizens, the unpaid amount will be more than 130 billion rubbles per month. In that case we talk not only about the deficit of the Pension Fund budget, but also about the reducing the level of the retired wellbeing.

Another way of calculating the pension size is using the replacement rate formula. It means that the maximum pension size, which is limited by the amount of income that can't be over the average salary in the region, multiplied by 1, 6, is determined. If the salary of the future retiree is above this value, the pension will still be calculated as "the average salary in the region multiplied by 1.6". Let's take as an example a senior citizen living in Tomsk region. In 2015 the average salary in the region was 31 727 rubbles. Multiplying this amount by 1.6 we will get an answer=50 763.2 rubbles, which will make 609

158.4 rubbles in a year. If the salary of the citizen is more than 50 763,2 rubles per month, for example, 70 000 rubbles (840 000 rubbles per year), his annual payment to the Pension Fund will be:  $670\,000 \cdot 22\% + 170\,000 \cdot 10\% = (147\,400 + 17\,000) = 164\,400$  rubbles (13 700 rubbles per month). If we take into consideration that the real work experience (35 years) exceeds the endowment period (21 years) by 1.7, there shouldn't be any Fund deficit. Thus, the pension system doesn't perform the task of an adequate income replacement when people retire. This system condemns the middle class to the sharp drop of income when they retire.

Now back to the expenses. In our opinion, here are three key reasons for the deficit of the Pension Fund from the position of "expenses":

1. performing functions of a "social state"
  - ability to receive pension and other benefits in advance. Employees working in hazardous industries or in harsh conditions, as well as teachers and health workers with big employment history, have the right to receive their pension before the official retirement age. About 35% of people start to receive their pension before they reach this age. 30% of women and 20% of men get their pensions by the age of 50 (Developing a funded pension system in Russia, 2013);
  - ability to receive pension, having no more than 5 years of work experience. But in line with the recent reforms this period is increased to 15 years;
  - funding the pension expenses of the self-employed citizens, although their insurance payments don't cover it (Long-term development strategy of the pension system of the Russian Federation, 2012);
  - adopted system of pension indexation on the inflation level leads to the fact that the payments don't compensate the inflation, and this leads to the Pension Fund deficit. An economic inefficiency of periodic pension indexation became evident 20 years ago. In 1995 "The concept of the reform of the pension fund system in the Russian Federation" was adopted and established new ways of pension regulations.
2. Performing redundant functions. A compulsory insurance coverage on a compulsory pension insurance are:
  - insurance disability pension (Federal Law 17.12.2001 N 173-FL). Disability is an insurance case when losing your salary. But if it occurred due to the production condition reasons, the responsibility lays on the employers and departments, who are in control of production safety. Otherwise, the distributive system «punishes» other retirees by reducing their income;
  - insurance pension for loss of breadwinner;
  - pension for "years of service";
  - social benefit for burial of the deceased retirees which was not a subject to a compulsory social insurance in case of temporary disability or maternity on the day of death (Federal Law 21.07.2014 N 216-FL).
3. In our opinion, a pension co-financing program doesn't result in an effective management of the pension fund. For example, this program involves 100% co-financing for 10 years. It turns out

that it is possible to place funds at 100% for 10 years, so the approximate rate will be 7-8% per annum. It is unlikely that people will be willing to place their funds on such a non-competitive conditions (rate and timing), so it's hard to hope for the Pension Fund income. But retired citizens can receive an amount paid voluntarily already in a year, thus place their funds at 100% (if 1:2) profitability per year (300% if 1:4) and for that there are many willing people. But as such return on investment is absolutely unreal, this program requires inadequate expenses from the Pension Fund.

Funded pensions can be the solution to these problems. The economy is interested in them, as they are long money, which are needed to finance investment projects. Also they allow government to replace possible employer taxes by the payments of citizens (Nabiulina E., 2016). They are needed for the citizens, as from 2013 more than 50% of citizens appeared to funded pension. Firstly, it is impossible to solve investment problems using pension money. Secondly, the main purpose is to provide safety and reliability of the pension savings. Funded pension part should be half the pension to be tangible for the retirees. According to forecast, this can be reached not earlier than in 2035. The plan of Gore (Lebedeva L.F., 2014) contained the idea that the funded part should be a part of the improvement of the pension system and an additional source of investment resources to the economy.

#### **4. Conclusion**

As a result, we can conclude that the Pension Fund is a basic source of material wellbeing of the retirees, the budget of which is deficit due to different reasons. The conducted assessment allows us to assume that the reasons for this are not only economic and demographic, but also organizational, including:

- Goals contradiction: the Pension Fund performs the functions of a “social state”, which leads to the fact that there are more obligations than rights (those, who contribute nothing at all or less than they will receive when retire, also get pension);
- Implementation of the pension co-financing program: it doesn't encourage retirees to take part in it, but results in high cost for the participants – current retirees.

The following actions can be taken to overcome the budget deficit:

- only the salary loss and not the loss of income or reaching retirement age can be considered as the insurance case. It means pension should be paid for “salary loss” and not for “retirement age”;
- all other pensions (disability, loss of breadwinner, maternity capital and so on) should be paid from general taxes;
- there should be a direct connection of the pension with the system payments. The pension should not be calculated from the “minimum of subsistence in a region” or from the salary;
- the part of the funded pension in income should be increased, as it is effective for both the retirees and the investment market, despite the fact that the activity of companies managing the funded pension is limited by the social component of the source and they can't function as investment companies;

- the combination of three components (state compulsory, compulsory funded and voluntary funded) in the pension system allows to the wellbeing of the retirees, as diversification reduces the risks.

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