“Definition and parameter analysis of the accumulative pension system”

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Definition and parameter analysis of the accumulative pension system

Abstract

The article studies the parameters of the accumulative pension system, particularly, the rate of contribution into the accumulative system, contribution period of the system's participants, the coefficient of replacement of the salary with pension after the retirement, the number of years of the future pension payments, alternatives of profitability of the funds accumulated by the system. The structure of the accumulative system is based on the methods and models of determining the parameters during the period of accumulation of resources after the retirement of the participant. The calculations are based on a variant basis. There are 6 interconnected parameters of the system's determination. The author has carried out formalization of determining the system's indicators and variant calculations. The most realistic for Ukraine is the introduction of accumulative system with the following parameters: contribution – 14% of salary (or preferably of income); contribution period – 35 years with the retirement of men at the age of 65 and women at the age of 60; the percentage of return on the savings – 3%. That is, in this case, the accumulation system will provide a pension with the income-replacement ratio of 0.6 over 18.4 years.

The model can be used at the state level (when determining the rate of contribution into the accumulation system, the contribution period and the income-replacement ratio with the fixation of other parameters) and by the system's participants (when determining the number of years using the accumulated pension, the income-replacement ratio and monitoring one's own resources).

Keywords: accumulative pension system, the rate of contribution, contribution period, income-replacement ratio, years of pension payments, complex percentage yield.
JEL Classification: J32.

Introduction

Problem statement. One of the ways of reforming the pension system of Ukraine is an introduction of the accumulative system. It is much more efficient than the country's current PAYG pension system. But in Ukraine, with its low level of wages, parallel deductions into the accumulative system would be burdensome for the working people during the accumulation of funds. The terms of implementation, the size of contributions and the contribution period of the system's participants depend on the relationship of these parameters of the accumulative system. Accordingly, the identification and analysis of parameters of the accumulative pension system is relevant and timely.

Analysis of the recent research and publications. The analysis of the social nature, legal framework and socio-economic basis of compulsory state pensions is given in the manual of B. Zaychuk (Zaychuk et al., 2005). The issue of organization of institutions and finances of the mandatory and voluntary pension insurance, the theory and practice of their functioning in the Russian Federation, which is close to the conditions in Ukraine, was studied by B. Royk (Royk, 2014).

Generalization of the world experience of the functioning of social insurance systems and the possibility of its use in Ukraine is reflected in the work of Yuri Pavlenko (Pavlenko, 2002). Imbalances of the contemporary pension system of Ukraine and the associated risks are analyzed by S. Zhovnir (Zhovnir, 2011).

E. Libanova (Libanova, 2002), studied the demographic preconditions for reforming the pension system and proposed a set of measures aimed at increasing revenues and reducing expenditures of the Pension Fund of Ukraine stressing the need in introducing savings accounts of the voluntary pension insurance. G. Mihalchenko (Mihalchenko, 2011), O. Penkova (Penkova, 2012) as one of the objectives of the pension reform emphasize the creation of conditions for the accumulation of sufficient retirement savings by introducing a mandatory accumulative system and by developing a system of voluntary pension savings paid by the citizens and their employers, which can be very effective only under conditions of relatively low and predictable inflation rates. B. Blyznyuk (Blyznyuk, 2008) proved that there is no alternative to raising the retirement age of the Ukrainian citizens and studied social consequences of introduction and development of the accumulative pension system.

A special approach to modernizing the organizational and economic mechanism of the pension sys-

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tem in Ukraine by establishing a territorial accumulative pension fund in each macro-region is proposed by I. Noga (Noga, 2015).

In the joint work with V. Besedin (Besedin, Berezina, 1999) we stressed the need to gradually introduce a three-tier pension system and substantiated a system of its indicators.

There remains a need for further research to identify and analyze the interconnected complex of parameters of the accumulative pension system in Ukraine.

The article's goal is the definition and formalization of parameters for the accumulated pension system in Ukraine based on the analysis of its contemporary issues and trends.

1. Presentation of the main material

Starting in July 1, 2017 according to the bill number 4608 "On Amendments to Certain Legislative Acts of Ukraine on the introduction of a defined contribution system of compulsory state pension insurance and common principles of pension calculation", the accumulative pension system is to be introduces (retrieved from http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=58998). It applies to citizens who are subject to compulsory state pension insurance and who at the date of the transfer of insurance contributions to the Accumulation Fund are not older than 35, and who pay contributions or the fees are paid for them into the accumulative pension system (retrieved from http://tyzhden.ua/News/182251).

The accumulative pension system is fully funded through individual pension contributions of the working people or through occupational pension insurance. An employee makes cash contributions into an individual pension account during the period of employment. These funds are invested into the selected investment projects until the participant of the accumulative system reaches the retirement age. Then he can use the saved money together with the accrued interest. The money saved by the employees will be used by them after their retirement.

The accumulative pension system has significant advantages and positive qualities, which include:

- independence from the demographic factor (the ratio of pensioners to employees);
- resources accumulated in accumulative pension funds contribute to the growth of savings of the population and economic development by investing in effective projects;
- employees own their accumulative pension accounts and can observe their finances during the period of accumulation and the period of use;
- the temptation of employees to avoid paying contributions decreases, which helps bring the resources out of the shadow sector.

A significant drawback of accumulative pension system is that it has enormous difficulties providing protection from bankruptcy, inflation, embezzlement of funds and excessive risks.

Introduction of accumulative pension system is associated with the need to solve such problems as identification of sources and rates of contributions to savings funds. Regarding the funds for the accumulation system the following options are possible such as expansion of the number of contributors to accumulative system, increase in insurance premiums and contribution periods, reduction in administrative costs and possible participation of business and state in the creation of accumulative funds.

A growing number of contributors to the accumulative pension system can be a very effective measure. Today, in Ukraine there are about 20 million people of working age with 16 million employed in the economy, and pension premiums are paid only by 10 million people. Based on the principle that all people should take care of their material security in their old age, all people must pay taxes. That is, the state still has reserves of expanding the number of taxpayers into the pension system.

An increase in premium rates is too problematic. The rate of a single social contribution in 2016 was reduced from 38% to 22%, but even after its reduction it is still burdensome for employees. Moreover, it has not produced the expected results, because the decreasing revenues for the pension fund were not offset by additional contributions resulting from the wages leaving the shadow sector. If premiums are increased, it will negatively affect the economic condition of the state.

Therefore, in spite of the difficulties, there is another way of reducing pension costs. It should be noted that we do not mean an absolute reduction of pension payments to retirees, but rather the implementation of such measures, which would make it possible to make a more efficient use of the funds that are contributed for the provision of pensions. This means the introduction of accumulative pension system.

The process of implementation of accumulative pension system involves the definition of its parameters. These are, first of all, such parameters as a rate of contribution into the accumulative system, a period of contribution of the system's participants, the rate of replacement of salaries with pensions after retirement, the number of years of pension payments in the future, profitability of the accumulated resources, etc. The solution of these problems is connected to the development of complex methods and models for determining the parameters of accumulative pension system.

To make an analysis we conduct the formalization of calculations of the basic parameters of accumulative system. It is conducted under conditions of stable prices for two consecutive stages: a stage of accumulation of funds and a stage of their use.

By analogy, with the formula of compounded interest depending on the norm of insurance premiums, the contribution period and profitability of accumulated funds in the *t*-th year the prospects for the *i*-th year of the contribution period at *p*-th interest will be equal to:

$$M_{tip} = V_{tip}(1+\frac{C_{tip}}{100})S_i, \quad (1)$$

where, *t* is a year of perspective from the implementation of the accumulative system; *i* – a serial year of investments into the accumulative system (the current year of the contribution period); *p* – percentage yield on the accumulated funds; V_{tip} – the size of insurance premiums in the *t-th* year with the *i-th* year of contribution period at *p-th* percentage yield; C_{tip} – percentage yield; S_i – contribution period.

The size of contribution is calculated with the following formula:

$$V_{tip} = 12N_{tip}\frac{n_{tip}}{100})S_i, \quad (2)$$

where, N_{tip} is a monthly salary; 12 – number of months in a year; n_{tip} – the rate of insurance premium, percentage of salary.

The expression (1) corresponds to the growth of contributions of the *i* – the year of the contribution period in the *t*-th year of the perspective at *p*-th percentage yield. The accumulation of funds in the *t*-th period for all contributions can be determined by the summation of the accumulated funds in all the years of the contribution period:

$$M_{tp} = \sum_i [V_{tip} \times (1+C_{tip}/100)^{S_i}]. \quad (3)$$

Practical calculations by formulas (1), (2) and (3) are too cumbersome and time-consuming. Therefore, it is proposed to carry out the following transformations. We introduce the rate of return on the funds in the accumulative system as the ratio of the final sum of the contribution to the amount of the insurance premium. According to the expression (1) it will be equal to:

$$k_{tip} = (1+\frac{C_{tip}}{100})^{S_i}. \quad (4)$$

In this case, the final amount of the contribution is defined simply as:

$$M_{tip} = V_{tip}k_{tip}. \quad (5)$$

The coefficient of return (k_{tip}) in year *t* for the contribution of the *i*-th year of the contribution period and for the *p*-th percentage yield is calculated consistently by years of the perspective with the following formula:

$$k_{tip} = k_{(t-1)ip}(1+\frac{C_{tip}}{100}). \quad (6)$$

The coefficient of return in year *t* for all the previous years of existence of the accumulative system is:

$$k_{tp} = \sum_i k_{tip} / S_i. \quad (7)$$

The amount of funds in the accumulative system in period *t* is calculated according to the following expression:

$$M_{tp} = \sum_i M_{itp}. \quad (8)$$

To determine the ratio of return it is expedient to use the matrix of yield coefficients according to the years of the system's functioning and the years of contribution payments (Table 1, see Appendix). It was created for the unit of measurement of funds, that is, 1 Hryvnia. If one is substituted by the amount of contribution we obtain the sum of accumulated funds in the relevant years of contribution payments. Horizontally we can see the perspective years, when the invested funds stay in the system before the expiration of the insurance period, vertically – the years of the contribution period. Given the large size of the matrix, some data for certain years are missing and marked by dots in Table 1. The cells of the matrix show the rates of return from the contributions according to the formula of compound interests for the period *t*. Each row of the matrix corresponds to the relevant year of contribution period and originates from the serial number of the contribution's year. The last row of the matrix shows the rate of return of the accumulative system as a whole for the period *t* at a *p*-th percentage yield (k_{tp}).

For example, for the contribution of the first year of the system's functioning the rate of return in the tenth year will amount to 1.34, that is, in ten years the amount of contribution will increase by 34%. If a contribution is 10 thousand Hryvnias, then in 10 years its value will be equal to 13.4 thousand Hryvnias. This matrix is made up for the annual return of 3%, while for other variables of the percentage yield separate matrixes are compiled.

The analysis of the matrix of returns shows that the rate of return (and, correspondingly, the final amount of the contribution) significantly increases with the growth in the period of accumulation. For

example, with the rate of return of 3 percent the rate of return in the first 5 years (and subsequently, the contribution) increases from 1 to 1.16 (16%), and in 31-35 years – from 2.43 to 2.81 (38%). This demonstrates the importance of making contributions into the accumulative system as soon as possible, preferably in the beginning of one's labor activity.

Naturally, the rate of return is largely related to the percentage yield rate (Figure 1). When the rate of the percentage yield is 1% the rate of return for the system in the 35th year of its functioning is 1.2, at the rate of 5% it increases to 2.71, that is, the return for the system grows 2.3 times. It is clear that to achieve such high rates of return in the long run would be very difficult, but it should remain an overall objective. The rate of return depends on the situation in the country and the world, the quality of accumulative agencies that must invest resources into effective projects and respond to risks in timely fashion. Experience shows that a high percentage of return is associated with greater risks, especially in the countries with unstable economic situation and in the developing countries. Countries with developed economies rely on the low, but stable rate of return within 1-1.5%. In Ukraine some optimistic experts expect a 4-5% return on the funds of the accumulative system, but they do not consider the local conditions and future risks. Of course, the rate of return is attractive, but considering the world experience we can predict the percentage yield for Ukraine at 3%. And even in this case state guarantees and pains taking work of accumulative pension funds will be required.

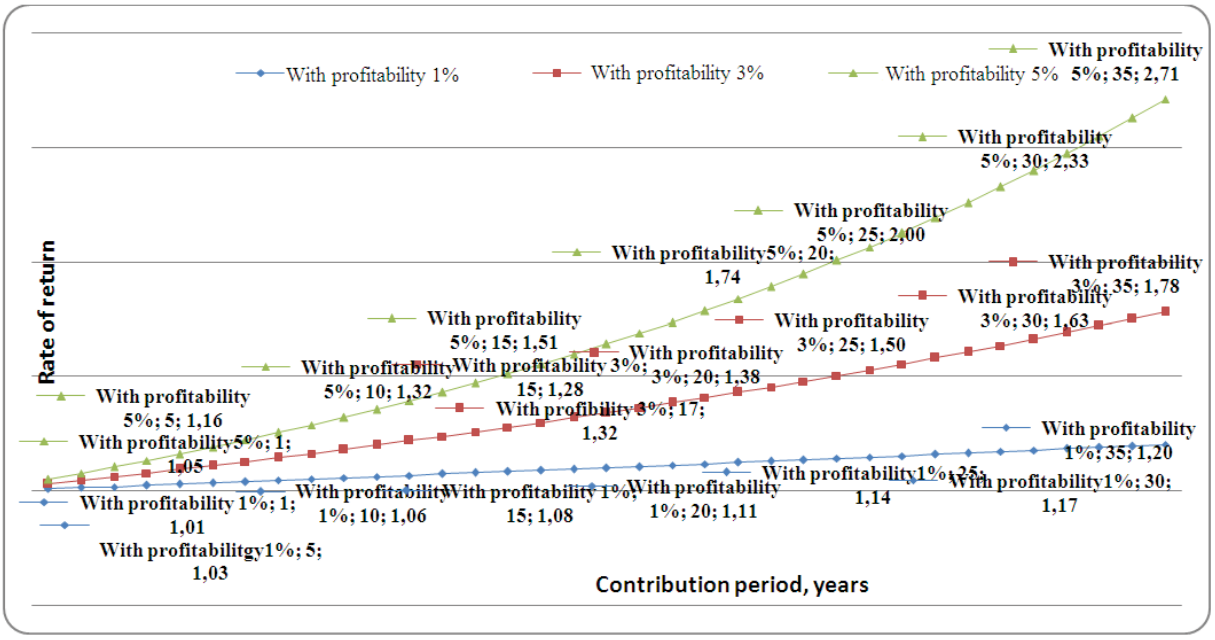

Fig. 1. Dynamics of the rates of return with different percentage yields of the accumulative system's funds

The conducted computation of resources in the accumulative pension system depending on the contribution period, the size of contributions and compound interest on the accumulated funds is presented in Table. 2. In this table a monthly salary is set at 6 thousand Hryvnias. Estimates are made in constant prices at the beginning of introduction of the accumulative pension system for 3 variants of percentage yields and the most representative values of contribution periods and the rate of insurance premiums. The final amounts of the accumulated funds are presented in thousand Hryvnias.

Table 2. The amount of accumulated funds in the accumulative pension system

Contribution period, years	Volumes of accumulated funds																	
	Percentage yield – 1%						Percentage yield – 3%						Percentage yield – 5%					
	The rate of insurance premium, %						The rate of insurance premium, %						The rate of insurance premium, %					
	10	15	20	25	30	35	10	15	20	25	30	35	10	15	20	25	30	35
10	76	116	159	205	251	302	85	138	199	270	350	449	95	163	251	360	501	683
15	114	175	240	308	377	453	127	207	298	405	526	673	143	245	376	540	751	1024
20	152	231	317	407	499	600	170	276	397	540	701	897	190	326	501	720	1002	1366
25	191	292	400	513	629	756	212	346	497	675	876	1121	238	408	626	900	1252	1707
30	229	350	480	616	755	907	255	415	596	810	1051	1346	285	489	752	1080	1503	2049
35	267	408	559	718	880	1058	297	484	696	945	1227	1570	333	571	877	1260	1753	2390

Dependence of the volumes of accumulation of funds on the rate of contribution and percentage yields is graphically shown in Figure 2. The analysis of the data in Table 2 and Figure 2 shows that the volumes of accumulated funds change in proportion to the contribution period and premium rates, while the percentage of yields affects the amount of money exponentially. If, in the range of 10-15% of insurance premiums at a percentage yield of 3% the amount of funds increased by 187 thousand Hryvnias, in the range of 30-35% it increased by 343 thousand Hryvnias, that is, the increase of funds through the percentage yield is 156 thousand Hryvnias in the same contribution period. It confirms the particular importance of the percentage yield in implementing the accumulative system.

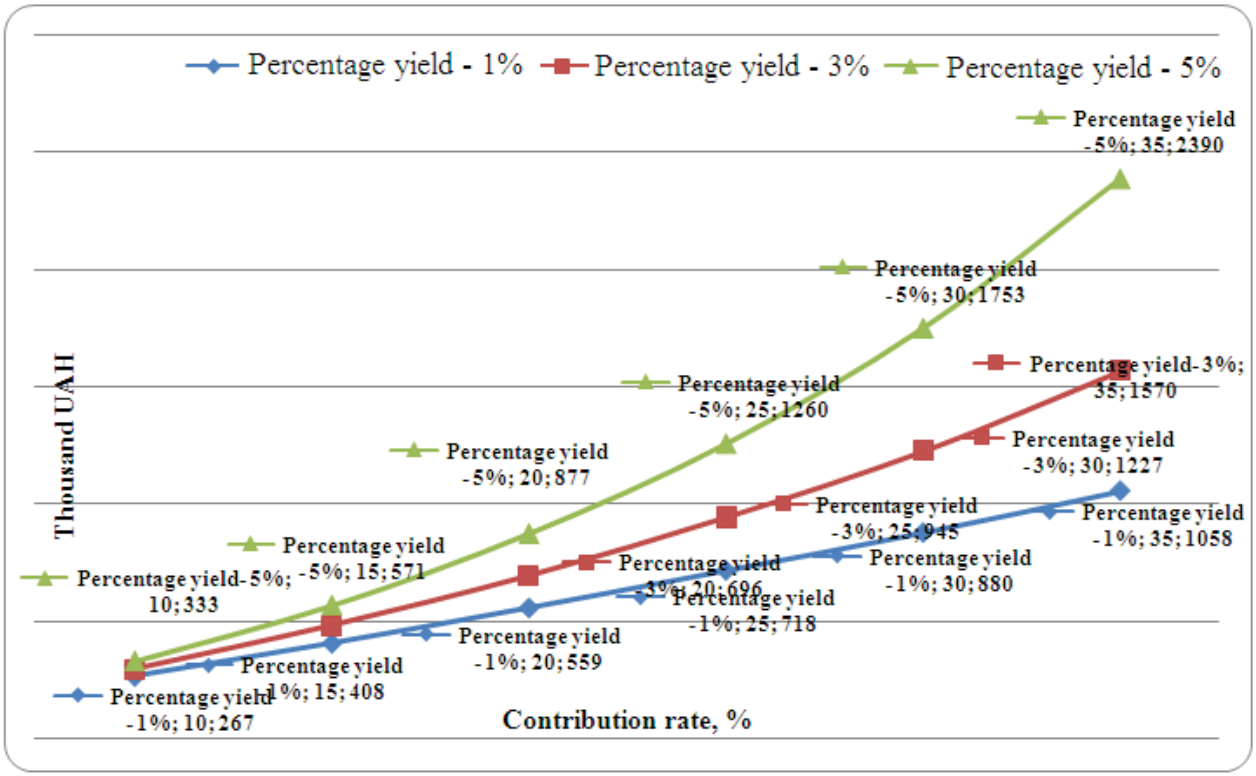

Fig. 2. Dependence of the volumes of accumulation of funds on the percentage yield

The amount of the accumulated funds of the accumulative system's participants is the money to pay pensions. It raises the question about the determination of replacement rate and the number of years when pensions will have to be paid at a given complex rate of profitability.

Let us designate the amount of money for pension payments as $П_{tzp}$, where z is a serial number of the year a pension starts to be paid. During this year, an interest will accrue at a rate of C_{tzp}. Each year from this amount the annual pension P_{tzp} will be allocated. Then the balance of pension funds in year t will be:

$$\Pi_{tzp} = \Pi_{(t-1)zp}(1+\frac{C_{tip}}{100}) - P_{tzp}, \quad (9)$$

where $П_{(t\text{-}1)zp}$ is the balance of pension funds from the previous year, *thousand Hryvnias*; P_{tpz} – the size of the annual pension payment, *thousand Hryvnias*.

$$P_{tzp} = 12N_{tip}\frac{z_{tip}}{100}, \quad (10)$$

where Z_{tzp} – replacement rate.

Replacement rate is set by directive depending on the final amount of accumulated funds based on the calculations of its variants. The number of years of the future payment of pensions at a given replacement rate can be defined as follows:

we set up a sequence:

$$\Pi_{(t=1)zp} \times C_p - Z_{i(t=1)p} \times N_{i(t=1)p}, \ldots, \quad (11)$$
$$\Pi_{(t=\mu)zp} \times C_p - Z_{i(t=\mu)p} \times N_{i(t=\mu)p\ldots}$$

till the moment when ($t = \mu \leq 0$);

- we determine the number of years of the future payment of pensions as a difference between the year of the last positive value of pension funds μ and the previous year of the payment of contributions t_0.

Calculations of parameters for the use of the accumulative system's funds (as well as the parameters for the accumulation of funds) should be carried out by using the appropriate matrix. The lines of such a matrix show the balance of funds by year, while the

columns show the balance of funds according to the years of pension payments with their dynamics in the future (Table 3, see Appendix). With such a matrix it is convenient to vary the rate of replacement and the number of years for the payment of pension from the accumulative system.

With the set rate of return, the number of years for the payment of pension depends on the rate of replacement, or vice versa. The variants of correlation of these parameters are determined by the chosen goals, which usually depend on the demographic situation in the country, that is, the average life expectancy of the system's participants after retirement.

According to the data of the Institute of Demography (Pavlenko, Yu, 2002), in Ukraine men on average live 15 years after retirement and women –20. Considering the fact that life expectancy is growing, one can expect that at the time of retirement of the accumulative system's participants the payment of pensions will remain the same even with an increase in the retirement age. Accordingly, variants of parameters of the system can be viewed with the periods of pension payments for 15, 20 and 17.5 years on average.

Table 4 provides practical calculations of the most important parameters of the accumulative system for their different combinations. The number of years of the future pension payments at Z = 0.6 varies (within the analyzed parameters) from 4.6 years till the moment, when with the premium rate of 35%, the period of contribution of 35 years and the percentage yield of 5% the accumulative system's participant could receive his pension due to the interests only.

The dynamics of accumulation and spending of funds of the accumulative pension system under the condition of stable prices with average wages of 6 thousand Hryvnias and the rate of return of 3 percent is shown in Figure 3.

Table 4. Variants of interdependent parameters for the accumulation and use of the accumulative system's funds

The rate of insurance premium, %	Contribution period, *years*	General amount of contributions, *thousand UAH*	Rate of return	The final (for the period of pension payments - initial) amount of pension funds, *mln. UAH*	The number of years of the future pension payments at Z = 0.6
7	25	126	1.5	189	4.6
	30	151.2	1.63	246	6.2
	35	176.4	1.78	314	8.1
10	25	180	1.5	270	6.8
	30	216	1.63	352	9.2
	35	252	1.78	449	12.2
14	35	353	1.78	628	18.4
15	25	270	1.5	405	10.8
	30	324	1.63	528	15
	35	378	1.78	673	20.5
17	35	389	1.78	763	21.2
18	30	389	1.63	634	18.6
	35	454	1.78	807	26.8
20	25	360	1.5	540	15.4
	30	432	1.63	704	21.9
	35	504	1.78	897	31.5
25	25	450	1.5	675	20.6
	30	540	1.63	880	30.7
	35	630	1.78	1121	47.8
30	25	540	1.46	788	26.8
	30	648	1.59	1030	42.5
	35	756	1.73	1308	80.8
35	25	630	1.5	945	34.4
	30	756	1.63	1232	60.9
	35	882	1.78	1570	>100.0

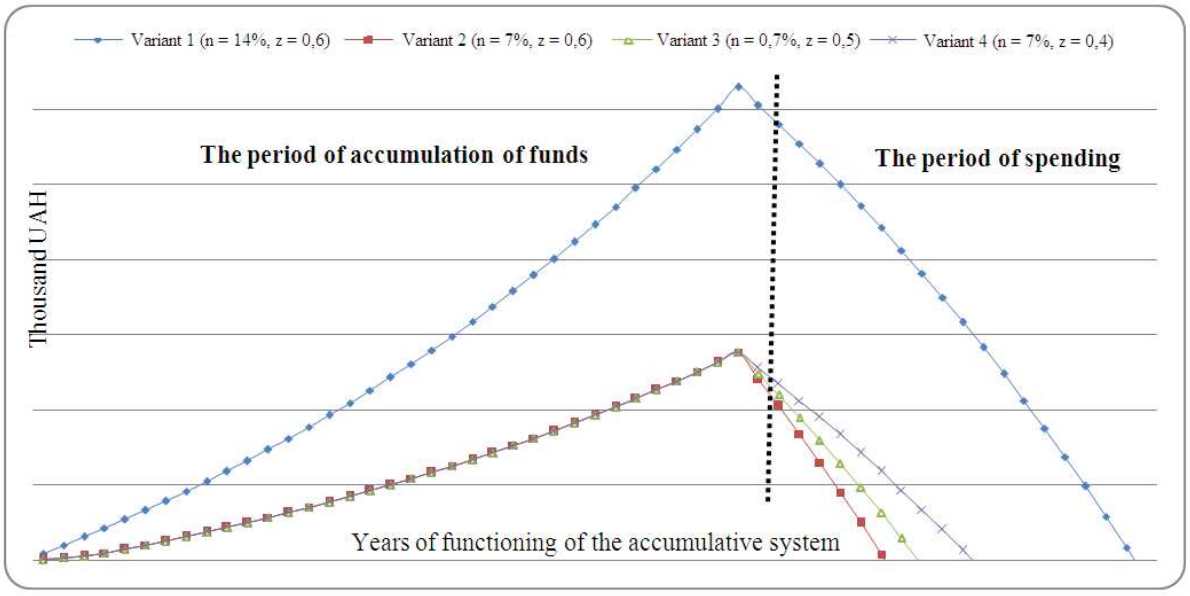

Fig. 3. The dynamics of parameters of the accumulative system according to the variants of accumulation and spending of funds

Variant 1 in the period of accumulation is built under conditions when the rate of contribution is 14% of the salary and the contribution period is 35 years. The period of spending at the rate of replacement 0.6 is 18.4 years.

Variant 2 is built according to the adopted variant for the introduction of the accumulative system, that is, when the rate of contribution in the first year of implementation is 2% with the annual growth in the following years by 1% to the stable 7% thereafter. The period of contribution is 35 years.

If, for example, the average monthly wage is 6 thousand Hryvnias, in the first 5 years 15.1 thousand Hryvnias will be accumulated and in the remaining 30 years – 261.3 thousand Hryvnias, and together – 276.4 thousand Hryvnias. When the replacement rate is 0.6, the accumulated funds will be sufficient only for 6.2 years of pension payments. Even at a lower replacement rate in the 3rd variant to 0.5 and in the fourth variant to 0.4 the number of years of pension payment will be 7.8 and 10.5 years, which does not provide pensions throughout the retirement age of citizens. Naturally, with such parameters the accumulative system will be inefficient.

The first variant of the accumulative system's parameters is acceptable. It provides a sufficiently high level of the accumulation of funds and a long period of pension payments (18.4 years). Contributions into accumulative funds per participant will be 0.84 thousand Hryvnias a month, while the size of pensions will be 3,6 thousand Hryvnias in comparable prices. And this is a significant step towards decent pensions.

As a result, it should be noted that the established approach to modeling the parameters of the accumulative system may be a universal instrument for the variant analysis and the forecast of a new, more efficient system that will contribute not only to the solution of the pensioners' problems, but also to the growth of the national economy.

Further studies according to the proposed approach should be aimed at identifying the accumulative and solidarity systems' parameters in the combined three-tier pension system, with an introduction of all three tiers of the pension system – solidarity, mandatory and voluntary levels.

Conclusions

1. From the macroeconomic position, the main area of the state pension policy in the short term perspective should be the bridging of the gap between the revenues and expenditures of the Pension Fund's budget. The possibilities for social populism are already exhausted and the state cannot afford itself to live beyond means. The crisis of the pension system makes it necessary to choose the areas of its reforms.
2. The modern concept of implementation of the accumulative pension system is not objectionable, but its parameters require a more detailed substantiation. The rate of insurance premiums, the period of contribution, the rate of replacement and other parameters of the system not only determine the future level of public pensions, but also directly affect the quality of life of the current generation.
3. Determination of the accumulative system's parameters should be built on the methodology, which is based on the models and methods of

determining the parameters in the period of accumulation of funds and in the period of their use after the retirement of the accumulative system's participants. The proposed approach to determining the interconnected parameters of the accumulative system, based on a systems approach with the possibility of variant calculations, demonstrated its suitability and sufficient accuracy for practical use.

4. The analysis shows that the most realistic and effective for the Ukrainian conditions is the introduction of the accumulative system with the following parameters: the rate of insurance premium -14% of salary (and, preferably, of income); contribution period -35 years at the retirement age of 65 for men and 60 for women; percentage yield of the accumulated funds -3%. That is, in this case the accumulative system can provide an average pension with the rate of replacement of 0.6 over 18.4 years.
5. The model of the accumulative system's parameters can be used both on the national level in determining the rate of contribution into the accumulative system, the period of contribution and the rate of replacement with the fixation of other parameters, and directly by the system's participants in determining such parameters as the number of the future years in the accumulative system, the rate of replacement and for the monitoring by people of their funds in the electronic personal offices during the period of accumulation of funds and in the period of their use.
6. The accumulative system will ensure independence from the demographic factor (the ratio of pensioners to employees) and give a big impetus to economic development by investing the accumulated funds into effective projects. It is possible on condition that the state will guarantee the preservation of resources from inefficient and nontransparent use, bankruptcy and inflation.

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Appendix

Table 1. Matrix of the rates of return from the funds of the accumulative system

Contribution thousand Hrn.	Contribution period, *years*	Years of accumulation																									
		1	2	3	4	5	6	7	8	9	10	..	15	..	20	...	25	26	27	28	20	30	31	32	33	34	35
		Rates of return																									
1	1	1.03	1.06	1.09	1.13	**1.16**	1.19	1.23	1.27	1.30	**1.34**	...	**1.56**	...	**1.81**	...	**2.09**	2.16	2.22	2.29	2.36	**2.43**	2.50	2.58	2.65	2.73	**2.81**
1	2		1.03	1.06	1.09	**1.13**	1.16	1.19	1.23	1.27	**1.30**	...	**1.51**	...	**1.75**	...	**2.03**	2.09	2.16	2.22	2.29	**2.36**	2.43	2.50	2.58	2.65	**2.73**
1	3			1.03	1.06	**1.09**	1.13	1.16	1.19	1.23	**1.27**	...	**1.47**		**1.70**	...	**1.97**	2.03	2.09	2.16	2.22	**2.29**	2.36	2.43	2.50	2.58	**2.65**
1	4				1.03	**1.06**	1.09	1.13	1.16	1.19	**1.23**	...	**1.43**		**1.65**	...	**1.92**	1.97	2.03	2.09	2.16	**2.22**	2.29	2.36	2.43	2.50	**2.58**
1	5					**1.03**	1.06	1.09	1.13	1.16	**1.19**	...	**1.38**		**1.60**	...	**1.86**	1.92	1.97	2.03	2.09	**2.16**	2.22	2.29	2.36	2.43	**2.50**
1	6						1.03	1.06	1.09	1.13	**1.16**	...	**1.34**		**1.56**	...	**1.81**	1.86	1.92	1.97	2.03	**2.09**	2.16	2.22	2.29	2.36	**2.43**
1	7							1.03	1.06	1.09	**1.13**	...	**1.30**		**1.51**	...	**1.75**	1.81	1.86	1.92	1.97	**2.03**	2.09	2.16	2.22	2.29	**2.36**
1	8								1.03	1.06	**1.09**	...	**1.27**		**1.47**	...	**1.70**	1.75	1.81	1.86	1.92	**1.97**	2.03	2.09	2.16	2.22	**2.29**
1	9									1.03	**1.06**	...	**1.23**		**1.43**	...	**1.65**	1.70	1.75	1.81	1.86	**1.92**	1.97	2.03	2.09	2.16	**2.22**
1	10										**1.03**	...	**1.19**		**1.38**		**1.60**	1.65	1.70	1.75	1.81	**1.86**	1.92	1.97	2.03	2.09	**2.16**
1	11											...	**1.16**		**1.34**		**1.56**	1.60	1.65	1.70	1.75	**1.81**	1.86	1.92	1.97	2.03	**2.09**
1	12												**1.13**		**1.30**		**1.51**	1.56	1.60	1.65	1.70	**1.75**	1.81	1.86	1.92	1.97	**2.03**
1	13												**1.09**		**1.27**		**1.47**	1.51	1.56	1.60	1.65	**1.70**	1.75	1.81	1.86	1.92	**1.97**
1	14												**1.06**		**1.23**		**1.43**	1.47	1.51	1.56	1.60	**1.65**	1.70	1.75	1.81	1.86	**1.92**
1	15												**1.03**		**1.19**		**1.38**	1.43	1.47	1.51	1.56	**1.60**	1.65	1.70	1.75	1.81	**1.86**
1	16														**1.16**		**1.34**	1.38	1.43	1.47	1.51	**1.56**	1.60	1.65	1.70	1.75	**1.81**
1	17														**1.13**		**1.30**	1.34	1.38	1.43	1.47	**1.51**	1.56	1.60	1.65	1.70	**1.75**
1	18														**1.09**		**1.27**	1.30	1.34	1.38	1.43	**1.47**	1.51	1.56	1.60	1.65	**1.70**
1	19														**1.06**		**1.23**	1.27	1.30	1.34	1.38	**1.43**	1.47	1.51	1.56	1.60	**1.65**
1	20														**1.03**		**1.19**	1.23	1.27	1.30	1.34	**1.38**	1.43	1.47	1.51	1.56	**1.60**
1	21																**1.16**	1.19	1.23	1.27	1.30	**1.34**	1.38	1.43	1.47	1.51	**1.56**
1	22																**1.13**	1.16	1.19	1.23	1.27	**1.30**	1.34	1.38	1.43	1.47	**1.51**
1	23																**1.09**	1.13	1.16	1.19	1.23	**1.27**	1.30	1.34	1.38	1.43	**1.47**
1	24																**1.06**	1.09	1.13	1.16	1.19	**1.23**	1.27	1.30	1.34	1.38	**1.43**
1	25																**1.03**	1.06	1.09	1.13	1.16	**1.19**	1.23	1.27	1.30	1.34	**1.38**
...	...	...	...	...	...																						
1	33																								1.03	1.06	**1.09**
1	34																									1.03	**1.06**
1	35																										**1.03**
Rate of return of the accumulative system *Ktp*		1.03	1.05	1.06	1.08	1.09	1.11	1.13	1.14	1.16	1.18	...	1.28	...	1.38		1.50	1.53	1.55	1.58	1.61	1.63	1.66	1.69	1.72	1.75	1.78

Table 3. Matrix of parameters for the use of funds of the accumulative pension system

Years of pension payment	The balance of funds at the year's beginning	The balance of funds for the years of the finds' use, thousand Hryvnias																	
		1 year	2 year	3 year	4 year	5 year	6 year	7 year	8 year	9 year	10 year	11 year	12 year	13 year	14 year	15 year	16 year	17 year	18 year	19 year
	628	604	579	553	526	499	470	441	411	381	349	316	282	248	212	175	137	98	58	16
1	604	579	553	526	499	470	441	411	381	349	316	282	248	212	175	137	98	58	16	
2	579	553	526	499	470	441	411	381	349	316	282	248	212	175	137	98	58	16		
3	553	526	499	470	441	411	381	349	316	282	248	212	175	137	98	58	16			
4	526	499	470	441	411	381	349	316	282	248	212	175	137	98	58	16				
5	499	470	441	411	381	349	316	282	248	212	175	137	98	58	16					
6	470	441	411	381	349	316	282	248	212	175	137	98	58	16						
7	441	411	381	349	316	282	248	212	175	137	98	58	16							
8	411	381	349	316	282	248	212	175	137	98	58	16								
9	381	349	316	282	248	212	175	137	98	58	16									
10	349	316	282	248	212	175	137	98	58	16										
11	316	282	248	212	175	137	98	58	16											
12	282	248	212	175	137	98	58	16												
13	248	212	175	137	98	58	16													
14	212	175	137	98	58	16														
15	175	137	98	58	16															
16	137	98	58	16																
17	98	58	16																	
18	58	16,2																		
19	16																			