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**FORMATION OF A BALANCED MODEL OF UKRAINIAN  
 NONGOVERNMENT PENSION INSURANCE SYSTEM**

*This article considers the theoretical, methodological and practical issues of formation of the balanced model of nongovernment pension insurance, based on the principles of economic interests of the pension system participants. The key objective is to construct the balanced model of economic and organizational management of pension reform implementation in Ukraine and form economic and organizational mechanism for the balance of economic interests of agents participating in pension relations.*

*Keywords: pension system; nongovernment pension insurance; investors; government regulation on financial services market.*

Ліана О. Птащенко, Владислав В. Тополь  
**ФОРМУВАННЯ ЗБАЛАНСОВАНОЇ МОДЕЛІ СИСТЕМИ  
 НЕДЕРЖАВНОГО ПЕНСІЙНОГО ЗАБЕЗПЕЧЕННЯ В УКРАЇНІ**

*У статті розглянуто теоретичні, методичні та практичні питання формування збалансованої моделі розвитку недержавного пенсійного забезпечення, заснованої на принципах економічних інтересів учасників пенсійної системи. Запропоновано збалансовану модель економіко-організаційного управління процесами впровадження пенсійної реформи в Україні, а також організаційно-економічний механізм балансування економічних інтересів агентів, що діють у системі пенсійних відносин.*

*Ключові слова: пенсійна система; недержавне пенсійне забезпечення; інвестори; державне регулювання на ринку фінансових послуг.*

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**ФОРМИРОВАНИЕ СБАЛАНСИРОВАННОЙ МОДЕЛИ СИСТЕМЫ  
 НЕГОСУДАРСТВЕННОГО ПЕНСИОННОГО ОБЕСПЕЧЕНИЯ  
 В УКРАИНЕ**

*В статье рассмотрены теоретические, методические и практические вопросы формирования сбалансированной модели развития негосударственного пенсионного обеспечения, основанной на принципах экономических интересов участников пенсионной системы. Предложена сбалансированная модель экономико-организационного управления процессами внедрения пенсионной реформы в Украине, а также организационно-экономический механизм балансирования экономических интересов агентов, действующих в системе пенсионных отношений.*

*Ключевые слова: пенсионная система; негосударственное пенсионное обеспечение; инвесторы; государственное регулирование на рынке финансовых услуг.*

### **Introduction**

Pension insurance is the key element of social security of population in a country, developing on the basis of humanistic principles. Despite the fact that Ukraine is actively carrying out the reforms of its pension system, positive results in the field of nongovernmental pension insurance are practically unnoticeable. According to the Law #1057-IV "On nongovernment pension insurance" (2003) pension system will contain 3 stages: the solidary system of government compulsory pension insurance,

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the cumulative system of government compulsory insurance and the nongovernment pension insurance.

It is obvious, that the solidary system of pension insurance has exhausted itself and it's necessary for Ukraine to make a step in the implementation of long-term models of investment accumulation, which are considered to be an effective tool of economic growth. This way lies through the effective usage of other two stages of cumulative pension insurance – compulsive cumulative pension insurance and voluntary nongovernment pension insurance.

One of the key tasks in state and government control is to avoid social tension, related to poverty, social differentiation, unemployment etc. by the way of social security increase, including the provision of effective policy of pension insurance. In order to carry all these tasks it is necessary to create such a kind of pension system, which would stimulate the formation of pension savings by pensioners' incomes increase, maximal dependence of pension payments from personified deposits of the insured. It is supposed to provide motivation for salary and employment legalization. The problem of this pension system introduction becomes more urgent under the current demographical situation (low rate of births and a great number of pensioners).

Talking about low rate of pension insurance, the authors first of all mean extremely low rate of the replacement index – average pension to average salary. According to the data of Ministry of Finance of Ukraine, the average salary level was 3 ths UAH (January 2013), while the average pension was 1160 UAH. In that way the replacement index was on the level of 38.6%. It is important to show that the indicators are based on the statistical data, which include official salary only. As we take into account this fact, we can suppose that the real replacement index in Ukrainian economy is more than 2 times lower. International labor organizations consider as adequate for the pension insurance level the rate of no less than 40 % of salary.

According to the data of Ukrainian Statistical Committee the number of employed is 12 mln people, while pensioners – 13.8 mln people. So there are 1.3 of pensioners per 1 employed. Such kind of correspondence doesn't allow provision of adequate pension insurance at the expense of employed population. This means that the government must excrete additional financial resources every year in order to be able to pay pension. That proves the need of radical regulative measures implementation to improve the situation in pension system.

According to the selective analysis of NPF investment activity, which shows negative trends, the actuality of the proposed methodology is proved. For example, according to the evaluation of NPF "Pharmaceutical" the rate of real income for 3 analyzed years (2009–2011) has declined more than in 5 times, what can be explained by non effective investment operations of this NPF. Also we can admit significant increase of costs related to nongovernmental pension insurance. Particularly, the premium for assets management services for the last 3 years has grown 1.27 times, payment for administrators' services – has grown 3 times, payment for planed auditing services – 16 times. Besides, despite the positive trend of NPF income flows, which increased during 2010–2011 by 8.6 times and by 137% compared to 2009, the profit from investment in 2010 declined by 34.5% and 2011 NPF ended with losses. Such situation proves ineffective the NPF policy on the pension resources usage in the field of investment.

Understanding the necessity to lower tensions on the pension funds, the National Commission of Securities and Stock Market (NCSSM) and the National Committee of Financial Services has adopted in July of 2012 The Regulation limiting the costs related to nongovernmental pension insurance, which today is 7%. At the same time the authors suppose that such kind of government actions will not lead to desired results. It is more objective to calculate the cost rate in regard to pension incomes for the same period (instead of comparing costs with NPF net assets, the sum of which is accumulating for NPF functioning period).

As the purpose of pension assets investment first of all is safety of pension savings, investment strategy of nongovernmental pension funds must have more conservative character than other financial institutions have. And their investment activity must be permanently controlled by the regulator.

*Problem 1.* Opacity and inefficiency of NPF investment activities.

In 2012 the NCSSM has adopted The Concept of prudential supervision introduction at the professional stock market, which determines the prudential regulation, as confirmed by the regulation #553 (2012). In January, 2013 prudential supervision was implemented for securities trade and assets management activity of institutional investors.

Without commenting the Regulation described above, we consider it convenient to highlight the problem related to governmental control of nongovernmental pension funds. The practice of governmental regulation of financial services market indicates that the NCSSM doesn't have proper regulative impact on the NPF activity as they are not professional participants of the stock market. Meanwhile, the National Committee of Financial Services doesn't pay much attention to these financial institutions, as they are considered to be not profitable and don't manage pension assets by themselves. At the same time the authors consider that the tools of population motivation in nongovernmental pension participation are not sufficient. First of all, it is necessary to strengthen the regulative control over the NPF investments efficiency. As this control must be permanent and transparent its practical realization is possible by means of prudential supervision of the NPF investment activities.

*Problem 2.* The absence of population motivation in pension programs participation.

The practice of the countries with developed, sustainable and efficient pension systems shows that first of all it is necessary to have highly motivated population, ready to participate actively in future pension formation. For example, the US pension system has many similarities with Ukrainian one, as it combines governmentally regulated general federal program of pension insurance with other pension programs for federal officers, regional programs, voluntary pension plans and annuities of insurance companies, personal pension accounts IRA. But at the same time this system has crucial differences.

For example, American pension schemes and calculation methodologies differ from ours significantly. There are well spread private pension plans ESOP, programs 401-k, participation in future profit dealing, the popularity of which shows their social and economic efficiency for participants.

*Problem 3.* The absence of balance of economic interests in pension insurance.

The analysis of the detected problems, which restraint Ukrainian NPI development has inspired the authors to investigate the transition possibility of ideas, contained in the concepts of indicators balancing, into organizational and economic model of the NPI development, based on the principles of NPI agents economic interests balancing, according to specifications of economic relations development in Ukraine. This gives possibility to justify statistically and econometrically the scheme of pension savings attraction as a form of investment capital for developed real economy corporations and minimize the risks of NPF investments diversification.

#### **Research and publications analysis**

It is necessary to admit that the problems in the NPI functioning in different aspects are investigated by many economists. Demographical and financial preconditions of pension reforms in Ukraine are highlighted in the researches by M. Gura (2008), M. Sventchitsky et al. (2010). The state of Ukraine's pension system and the problems of its reformation has significant place in the researches of G. McTaggart (2004), I. Doronina (2008), M. Lazebna (2009), I. Libanova (2001), P. Matvienko (2006), L. Tkachenko (2008), M. Shapoval (2008). D. Leonov, A. Fedorenko and N. Kovaleva (2002) in their joint work investigated the problems of NPF investment activity. Financial risks in the context of pension reform were analyzed in the work by Skrypnyk and Liechtenstein (2007).

But still there are questions of pension insurance, discussed by native and foreign economists need more differentiated and detailed investigation, cause of new unsolved problems and the necessity for the creation of effective pension insurance system in Ukraine.

**The object of the research** is theoretical, methodological and practical issues of nongovernment pension insurance balanced model formation and development, including the review of directions in its implementation within the state socio-economic policy.

**The aim of the research** is to construct a balanced model of economic and organizational management of pension reform implementation in Ukraine and to build organizational and economic mechanism of economic interests balancing of pension insurance agents. That is the basis for the formation of specific proposals concerning the improvement of pension legislation, indicative system of NPF investment activity prudential supervision, and new directions of Ukrainian investment security.

**Methods of the research** are common cognition methods (dialectic, logical), the methods of theoretical generalization, historical and economical analysis, system approach, method of dialectic logics, and specified methods: analysis and synthesis, expert method, economic-statistic and econometric methods.

#### **The research findings**

The authors aim at complex theoretical developments, focused on the justification of development and realization of methodology of nongovernmental pension insurance model, which is based on the interests of pension system participants.

This will promote the enhancement of economic and organizational system of pension reform implementation in Ukraine. It will help to make its realization more effective and intensify investment capital flows into the real economy. As a result, it will promote the growth of national wealth.

### **Theoretical model description**

The basis for the construction of NPI balanced model lies in the concept by Kaplan and Norton (2004) and the main principles of the balanced scorecard system, as highlighted in the collective work of Nili, Adams and Kenerl (2003). Also there we used the recommendations of V. Ivlev and T. Popon (2002) and N. Olve and G.R.M. Waiter (2006). The investigation of the formation of theoretical positions concerning the regulation of economic interests in the NPI system has resulted in the formation of a conceptual model of economic interests balancing for the financial agents and their counteragents (government, enterprises, citizens).

According to the mentioned above, the hypothesis of the authors presupposes the following positive results in case of scientific justification and legal implementation of the balanced model of nongovernmental pension insurance, according to the interests of state, financial agents, investors who are represented as employers and individuals:

- the significant increase of trust of Ukrainian citizens to nongovernment pension funds and investment activity intensification as a result;
- the formation of more efficient system of management and control at the financial services market;
- minimization of risks related to investment funding of pension resources;
- the increase of investments in real economy;
- the enhancement of pensioners wealth;
- favorable conditions creation for the transition to the second stage of pension system.

The authors' framework is based on the systematic view of economic and organizational mechanism meaning and it determines the idea of this mechanism construction. It contains the following fields:

- determination of economic nature and the concept of governmental regulation in the system of NPI;
- determination of regulators, their functions and credentials;
- investigation of objects and subjects of regulation;
- formation of purpose of financial services market regulation;
- regulation methodology justification;
- determination of elements of internal and external regulation of pension and investment activity agents;
- construction of organizational and economic mechanism of financial services market regulation;
- construction of a balanced model of nongovernmental pension insurance.

### **The model assessment methodology**

Previously the authors have defined the economic nature and the concept of governmental regulation of economic interests. This category represents a system of legislative, economic, organizational, regulative and optimizational activities of state, oriented on balancing the economic interests of entrepreneurs and consumers. Also this system includes the management of state sector and social policy, oriented on provision of national economy efficiency and competitiveness. According to this approach, the concept model of organizational and economic regulative mechanism of economic interests at the financial services market suggests balancing economic

interests by means of regulation of financial subjects' activity at the levels of state, market and enterprises. The process of balancing assumes the appropriate methods and tools of management, oriented on development and improvement. Regulatory methods of influence on economic interests balance suppose direct (administrative) and indirect (economic) tools. This methods form the toolkit, where the leading position belongs to governmental regulation. Moreover, regulative methods must be based on appropriate principles.

Previously, in the research by L. Ptaschenko (2009) the set of attributes was identified in order to build economic and math optimization model of economic interests. These attributes characterize the significance level concerning the development of economic interests, related to desired economic results achievement and own needs satisfaction. Subject related to this are represented by government, financial agents and investors. Economic interests are ranged by the 10-point scale on the basis of expert evaluation (questionnaire survey is required). There are integral indicators of economic interests significance lying in base of framework. Their generalized values are calculated as a sum of indicators assets, taking into account the importance of every component receiver by expert method.

The integral indicator of significance of economic interests of pension insurance subjects is determined by the following formula, according to A. Ponomarenko et al. (2004):

$$ICN = R_x x + R_y y + R_z z, \quad (1)$$

where:  $x$ ,  $y$ ,  $z$  – economic interests of government, economic interests of financial services market agents, economic interests of investors (employees and citizens) respectively;  $R_x$ ,  $R_y$ ,  $R_z$  – respectively, the coefficients of economic interests significance.

The coefficient of concordance is used for the determination of links strength between a random number of ranged economic interests features, and it has the following formula:

$$W = \frac{12S}{m^2(n^3 - n)} (x_i \leq a_i), \quad (2)$$

where  $m$  is the quantity of factors;  $n$  is the quantity of observations;  $S$  – deviation of the sum of range squares from root mean square of this ranges.

The identification of concordance coefficient significance is determined by the Pearson's criteria.

The construction of economically balanced model of interests is based on the total equilibrium model by Makarov, which doesn't diversify economic agents of pension system on consumers and investors – depending on a situation every agent can be either consumer, or investor. At the same time the inequality of resources constraints of economic agents is taken into account:

$$\sum_{i=1}^3 x_i^2 / a_i^2 \leq 1, (x_i \leq a_i). \quad (3)$$

The Lagrange model is used for the problem solution, which in this case represent the function of risk attitude. This function has the following formula:

$$F(x_1, x_2, x_3) = \ln \prod_{i=1}^3 u_i^{\alpha_i}(x_i) + \lambda (\sum_{i=1}^3 x_i^2 / a_i^2 - 1) \quad (4)$$

The Lagrange equation for each agent separately has the following view:

$$F'_{x_1} = \alpha_1 \frac{u'_1}{a_1} + \frac{2\lambda x_1}{a_1^2} = 0, \quad (5)$$

$$F'_{x_2} = \alpha_2 \frac{u'_2}{a_2} + \frac{2\lambda x_2}{a_2^2} = 0, \quad (6)$$

$$F'_{x_3} = \alpha_3 \frac{u'_3}{a_3} + \frac{2\lambda x_3}{a_3^2} = 0. \quad (7)$$

$$\sum (x_i / a_i)^2 = 1. \quad (8)$$

Expressing  $x_i$  value in equations (5), (6) and (7) through the  $\lambda$  enables the following substitutions in equation (8):  $x_i = -(\alpha_i u_i \alpha_i^2 / 2\lambda u_i)$ , where  $i = 1, 2, 3$ . As a result we receive the following expression:

$$\sum_{i=1}^3 \frac{1}{4} \left( \frac{\alpha_i a_i u'_i}{u_i} \right)^2 = \lambda \Rightarrow \lambda = \frac{-1}{2} \sqrt{\sum_{i=1}^3 \left( \frac{\alpha_i a_i u'_i}{u_i} \right)^2}. \quad (9)$$

Let us substitute the received expression in equations (5), (6) and (7) for  $\lambda$ :

$$\alpha_j \frac{u'_j}{u} = \sqrt{\sum_{i=1}^3 \left( \frac{\alpha_i a_i u'_i}{u_i} \right)^2} \times \frac{x_j}{a_j^2}, \quad j = 1, 3. \quad (10)$$

If we mark  $(u'_j / u_j) = t_j, j = 1, 3$ , the model of economic interests of agents  $x_1, x_2, x_3$  receives the following view:

$$x_1 = \frac{a_1^2 \alpha_1 \times t_1}{\sqrt{\sum_{i=1}^{\infty} (\alpha_i a_i t_i)^2}}, \quad (11)$$

$$x_2 = \frac{a_2^2 \alpha_2 \times t_2}{\sqrt{\sum_{i=1}^{\infty} (\alpha_i a_i t_i)^2}}, \quad (12)$$

$$x_3 = \frac{a_3^2 \alpha_3 \times t_3}{\sqrt{\sum_{i=1}^{\infty} (\alpha_i a_i t_i)^2}}. \quad (13)$$

Let us describe the iterative process of finding the optimal solution for balancing economic interests of the agents  $x_1, x_2, x_3$ . This requires determining the ratio of marginal function of utility towards individual utility of each agent, i.e.:  $t_i(x_i)$ .

$$t_1 = \frac{u'_1}{u_1} = \frac{2/a_1}{-1 + \frac{2}{a_1} x_1} = \frac{2}{-a_1 + 2x_1}, \quad (14)$$

$$t_2 = \frac{u'_2}{u_2} = \frac{2b_2 x_2}{d_2 + b_2 x^2} = \frac{\frac{8}{3} a_2^2 x_2}{-1/3 + 4/3 \frac{x_2^2}{a_2^2}} = \frac{8x_2}{a_2^2 + 4x_2^2}, \quad (15)$$

$$t_3 = \frac{u'_3}{u_3} = \frac{e^{-x_3}}{e^{-a_3/2} - e^{-x_3}}. \quad (16)$$

As a primary value we take  $x_j^0 = a_j \times \frac{\alpha_j}{\sum_{i=1}^3 \alpha_i}$  and substitute it in right parts of the equations, thus finding the values of  $x_j^1, j = 1, 2, 3$ . Similarly, we substitute  $x_j^1$  and find  $x_j^2, j = 1, 2, 3$ . The substitution process ends if the following inequality is received:

$$\sum_{i=1}^3 (x_i^k - x_i^{k+1})^2 \leq \varepsilon \quad (17)$$

Subject to the above, the model of optimal solution of balancing the economic interests of state ( $x_1$ ), entrepreneurs ( $x_2$ ) and individual consumers ( $x_3$ ) –  $x_1^k, x_2^k, x_3^k$ , where  $k$  – is the number of iterative steps in the expression (17).

Then we can interpret the Lagrange's equation for every pension system agent. The calculations allow justification mathematically the authors' idea of the economic interests balance of the agents with the NPI system.

### **The results of the model implementation**

The realization of the author's idea allows the following:

- a) to solve the problem of nongovernmental pension funds investment activity, as they are the main participants of the 3-rd stage in the NPI system;
- b) to design organizational and economic balancing mechanism of economic interests of agents and its introduction, what will promote the provision of economic interests of government, investors (employees and citizens) and the agents at the financial services market;
- c) to improve current regulative tools (legislation, decisions of regulators, corporate management principles).

Previously the authors identified the nature and the concept of governmental regulation of economic interests, which represents itself as a system of legislative, economic, organizational, regulative measures of optimization, directed at balancing the economic interests of subjects and governmental management in the field of social policy, for the efficiency and competitiveness of the national economy. Being guided by this approach, the organizational and economic model of regulative mechanism of economic interests at the financial services market suppose the balancing of economic interests by means of governmental, market and internal regulation of financial activity. This process needs certain regulative tools and methods, oriented on development and enhancement. Regulative methods of influence on economic interests balance include direct (administrative) and indirect (economic) instruments. These methods form the methodology, where the leading place belongs to governmental regulation (prudential supervision).

The main idea while determining the strategic directions for balancing of economic interests is the necessity of taking into account all the needs of pension insurance participants. At the same time it is not useful to determine a great number of strategic tasks for the highest level of organization. Strategic directions must be based on the following criteria: they must be valuable, acceptable for all and coordinated with the main aim of policy realization; there must be present a possibility to influence the process of their implementation; here must be a sufficient level of knowledge and skills for their implementation.



As a result we receive the balanced system of purposes and criteria, which reflects the government strategy of the NPI system formation. At the same time it provides the maximum balance of economic interests of the society in general and individuals. The process of strategic map realization for economic interests balance must be based on the principles of regulation, economic growth, constant studying and self-improvement.

**Mission: formation of the favorable climate for pension reform realization on the basis of efficient government regulation and construction of a balanced model of nongovernment pension insurance, which would be able to satisfy economic interests of agents within the pension system**

<b>External direction</b>	Creation of regulative mechanisms and structures of NPI formation processes	Participation in the process of establishment of international regulative mechanisms of economic relations in the sphere of NPI, which provide the protection of state interests	
<b>Financial and economic direction</b>	Improvement of tools in credit, tax and pricing policy regulation	Construction of a fair incentive system for intensification of entrepreneurs' activity of the NPI	
<b>Public direction</b>	Provision of competitive and real discount rates	Provision of investment risk minimization, by means of prudential control for NPF activity	Improving the mechanism of informal economy reduction
<b>Social direction</b>	Intensification of compulsory state social insurance and nongovernment pension insurance	Establishment of the system of benefits and incentives for social programs implementation, including pension	
<b>Education and development</b>	Development of government support for scientific activity	Provision of information transparency and openness	Development of government programs is the area of informing and education of potential NPI investors
<b>Internal processes</b>	Stimulation of NPF development, transparency and stability	Improvement of the system of internal mechanisms of investment pension programs realization	

Source: Developed by the authors.

**Figure 1. Strategic map of government policy regulation in pension reform realization**

### Conclusion

The conceptual model represents a basis for developing an economic and organizational mechanism of economic interests balancing, acting within the system of pension insurance. This balance must be provided by governmental regulation and the balanced model of nongovernmental pension insurance and include scientific and practical recommendations concerning the strategy of social and economic development to justify new directions in Ukraine's investment security provision.

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