"Diagnosis of the socio-economic potential of health insurance"

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BUSINESS PERSPECTIVES

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DIAGNOSIS OF THE SOCIO-ECONOMIC POTENTIAL OF HEALTH INSURANCE

Abstract

This study investigates the features of the development of the discriminant model of diagnostics of the socio-economic potential of health insurance, and the trends in the medical insurance system development in Ukraine. This study uses logistic, statistical and normative methods to assess of the socio-economic potential of health insurance in Ukraine from 2010 to 2017. The empirical result shows that the block assessment of the financial potential of health insurance gives the complete information on the dynamics of individual indicators and trends of the branch. The need for assessment of the socio-economic potential of health insurance in order to improve the efficiency of the public financial management of the health care finance system and the insurance market regulation has been justified.

INTRODUCTION

The proper formation and timely assessment of the socio-economic potential of health insurance are essential to the sustainable and dynamic development of domestic insurance market, and the basis for the health insurance development in Ukraine. Thus, the crucial task of health insurance is to build the mechanism of compensation for losses to individuals by financing of the health care (services), including preventive care.

The socio-economic potential of health insurance includes the ability to use non-financial resources. The socio-economic potential of health insurance on the part of the insured is the totality of all forms of resources that are temporarily or relatively free and clear of any obligations and may be used by potential insurance market participants (usually individuals, less commonly – legal entities) for the provision of health services. On the part of the insurers, the socio-economic potential of health insurance is the totality of their resources and the resources of medical institutions, which may be used in the medium term to provide health services to individuals as the subjects of health insurance.

The assessment of the cost of health service and the totality of financial resources that can be used for its financing will be the bases in determining the financial potential of health insurance. In determining the socio-economic potential, the valuation of medical support and cost of all forms of resources that can be used will be the bases.

1. LITERATURE REVIEW

The main goal of the compulsory state social health insurance is to strengthen the responsibility for, and interest in health protection on the part of public authorities, enterprises, organizations and population, and to ensure the guaranteed level of medical aid and preventive measures (National Health System Reforming Strategy for Ukraine 2015–2020). The main sources of the health system financing in the existing health finance system are:

- taxes (direct and indirect);

- compulsory health insurance;

- voluntary health insurance;

- formal and informal direct payments of the population to health care institutions.

Taking into consideration the great social importance of the health care sphere, the sources of its financing should be assessed on the assumption of two perspectives: social equity and economic efficiency. The above sources of financing have both advantages and disadvantages. Thus, it is essential to talk about the full-fledged reform of the health care system of Ukraine with the legislative enshrinement of the programs of health service financing from the budget resources, the introduction of compulsory health insurance, the development of voluntary health insurance (see the works of Demchenko, 2016; Ponomarenko & Marchenko, 2014).

The compulsory health insurance as a source of the health care financing has such advantages as a purposive character, the independence of funds from the state, and their separation from other public funds. The amount of the compulsory health insurance deductions has no direct impact on the volume of the health services provided. However, the compulsory health insurance has certain disadvantages: the possibility of payers' evading the contributions, increase in labor cost and consequently loss of competitiveness of the state economy, dependence on the economic growth rate, the need to establish appropriate regulatory bodies, as well as the poor economic basis as deductions are usually made only from the pay-

roll fund without affecting other sources: investments, etc. (Veugelers & Yip, 2013).

The voluntary health insurance in Ukraine is developing quite rapidly, and has a positive trend towards increase. Among the advantages of the voluntary health insurance as a source of the health care system financing we should mention the possibility of contract extension, the relationship between the payment volumes and the amount of the health services rendered (see the works of Farrah, 2013; Chen et al., 2014). When it comes to the disadvantages of this source of financing, special supervisory authorities should be established in order to ensure adequate control over the amount of deductions. In addition, this source of funds has some other disadvantages, including in regard to social equity: the selection of markets, in particular, screening of at-risk group, meaning that the population with high-risk disease will not be insured; the selection based on the income level – more privileged population categories will receive the benefits of insurance (An Evaluation of the Individual Health Insurance Market and Implications of Potential Changes, 2017).

The provision of citizens with the opportunity to obtain the essential, timely and quality health care takes an important place in the system of measures aimed at improving their social security. The global experience shows that the ways of solution to this problem may be different. In general, they differ in the structure of the health care financing sources, and the arrangement of the medical service provision. The health care financing can be fiscal, social and private (see the works of Jasinski, 2015; Alexandersen et al., 2016; Hamel et al., 2016).

2. METHODS

2.1. Research design

The analysis of the population health status and trends in the development of the economic, social and demographic processes in Ukraine confirms the high relevance of the research on the positive development of the health care system and the improvement in the efficiency of use of the financial resources, on which the development of this sector is based.

Therefore, the assessment of the socio-economic potential of health insurance emerges full blown, and takes on particular significance, as it makes it possible to reveal internal problems and take the required measures well in advance (Chkan & Rubtsova, 2015).

The technologies of the formation, detection and identification of economic phenomena are widely used in the economically developed countries in order to reduce any risks resulting from managerial decision-making. A prerequisite for the application of this approach is the assumption of the existence of such indicators, which cannot be directly observed, but can be assessed based on several primary signs – observed factors. According to this approach, such factors are:

- use of financial resources;

- use of material resources;

- use of labor resources;

- use of information resources.

The proposed combination of factors determines such performance indicator as the financial potential of health insurance, which is the assessment of its socio-economic potential, and reduces it to the separation into four levels in order to identify the characteristics inherent in each of them. Let us define these levels:

- financial potential, which implies the absolute financial stability of health insurance (high level);

- financial potential, which implies the normal type of financial stability of health insurance (average level);

- financial potential, which provides for the precarious financial stability of health insurance (satisfactory level);

- financial potential, which provides for the crisis financial stability of health insurance (low level).

The task of dividing the socio-economic potential of health insurance into the classes is solved using the method of discriminant analysis, being part of the classic factor statistical analysis. The objective of the multifactor discriminant analysis is to assess and interpret the value of one dependent variable by values of several independent variables (impact factors).

In order to build the discriminant model of diagnostics of the socio-economic potential of health insurance, it is essential to select a number of indicators characterizing its robustness. A combination of indicators, for each of which the weight in the discriminator is determined, is selected during the analysis. The magnitude of individual weights represents different impact of individual indicators on the value of output variable, which, in perfect conditions, characterizes the socio-economic potential of health insurance.

The purpose of selection is to choose from a wide range of available indicators only those which enable to draw the most significant and reliable conclusions on the socio-economic potential of health insurance, thereby ensuring the high accuracy of such classification.

The first step in building the discriminant model of diagnostics of the socio-economic potential of health insurance is compiling the initial list of independent variables.

In order to make the diagnostics of the socio-economic potential of health insurance with the application of the previously developed approaches, and to build our own model of diagnostics of the socio-economic potential of health insurance, it is essential to forma database.

The 37 coefficients, which cover the indicators of the financial, material, labor and information resources use, were selected after the initial analysis of the indicators influencing the socio-economic potential of health insurance.

What follows is the task of selecting the most significant independent factors according to the degree of impact on the performance indicator when building the model of diagnostics of the socio-economic potential of health insurance.

From a mathematical point of view, this task is reduced to the optimal compression of informa-

tion on the factors affecting the socio-economic potential of health insurance, that is, to the reflection of this information by the minimal number of parameters at a given accuracy level, or to the information loss minimization with a given number of generalized coordinates. In this case, it is expedient to consider that the input factors selected for the model should cover various generalized groups of indicators.

The next step is the analysis of indicators from the point of view of their significance to determine the level of the socio-economic potential of health insurance, and their selection for the model of diagnostics of the socio-economic potential. It is possible to make the appropriate selection of financial indicators by testing them for multicollinearity on the basis of the following statistical criteria:

χ^2 – for the whole array of variables;

F – for each variable with the other variables;

t – for each pair of variables.

In this case, multicollinearity undermines the quantitative characteristics of the mathematical model, or even makes its construction impossible.

Another important aspect, which should be taken into consideration in the selection of indicators for the discriminant model of diagnosis of the socio-economic potential of health insurance, is associated with the measure of deviation of the values of independent variables at their intergroup matching.

Thus, for the selection of indicators that affect the level of the socio-economic potential of health insurance, it is advisable to use the general criterion of the discriminant of Wilks's lambda – L_W, and to include in the discriminant model the indicators with the lowest values L_W, belonging to the alternative levels of the socio-economic potential for clear definition of the base indicator – LMI.

A set of input factors for the model of diagnostics of the socio-economic potential of health insurance that cover all the main groups of indicators of financial stability of health insurance and are deprived of multicollinearity has been selected as a result of the analysis conducted. Thus, the model of diagnostics of the socio-economic potential of health insurance in the form of discriminant function based on the proposed combination of input factors with their own parameters has been obtained.

2.2. Discriminant model of diagnostics of the socio-economic potential of health insurance

This model is represented in a formalized way:

The indicator of the management of material resources of the socio-economic potential of health insurance (FM) is as follows:

$$FM = f\left(I_1, I_2, I_3, I_4\right), \qquad (1)$$

where I_1 – return on investment in medical equipment in the health care sphere, I_2 – actual volume of medical equipment per unit of labor, I_3 – bed population ratio in health care facilities per 10 thousand population, I_4 – ratio of medical equipment wear in the health care sphere.

The indicator of the management of human resources of the socio-economic potential of health insurance (FT) is as follows:

$$FT = f\left(I_5, I_6, I_7, I_8, I_9\right), \qquad (2)$$

where I_5 – doctor ratio per 10 thousand population, I_6 – nursing staff ratio per 10 thousand population, I_7 – ratio of students of medical higher educational institutions of III-IV accreditation level per 10 thousand population, I_8 – ratio of students of medical higher educational institutions of I-II accreditation level per 10 thousand population, I_9 – proportion of medical higher educational institutions in the total number of higher educational institutions of III-IV accreditation level.

The indicator of the management of public financial resources of the socio-economic potential of health insurance (GF) is as follows:

$$GF = f\left(I_{10}, I_{11}, I_{12}\right), \qquad (3)$$

where I_{10} – consolidated budget expenditures on health care per 1 inhabitant, I_{11} – average monthly doctor salary, I_{12} – average monthly nursing staff salary.

The indicator of the management of financial resources of health insurance companies of the socio-economic potential of health insurance $\left(MRF \right)$ is as follows:

$$MRF = f\left(I_{13}, I_{14}, I_{15}, I_{16}, I_{17}, I_{18} \right), \qquad (4)$$

where I_{13} – share of compulsory health insurance premiums in the total amount of insurance premiums, I_{14} – share of voluntary health insurance premiums in the total amount of insurance premiums, I_{15} – share of insurance indemnity under compulsory health insurance in the total amount of insurance indemnity, I_{16} – share of insurance indemnity under voluntary health insurance in the total amount of insurance indemnity, I_{17} – average ratio of insurance indemnity and insurance premiums under compulsory health insurance, I_{18} – average ratio of insurance indemnity and insurance premiums under voluntary health insurance.

The indicator of the management of financial resources of insured (individuals and legal entities) of the socio-economic potential of health insurance $\left(SR \right)$ is as follows:

$$SR = f\left(I_{19}, I_{20}, I_{21}, I_{22} \right), \qquad (5)$$

where I_{19} – average monthly salary per employee in the country, I_{20} – ratio of average monthly salary and minimum salary, I_{21} – ratio of average monthly salary and minimum cost of living established by law, I_{22} – proportion of health insurers in the total number of insured.

On the basis of the expert method, it is necessary to determine the weight values of indicators of the socio-economic potential of health insurance.

Hence, the formulae for the calculation of the reduced indicators are as follows:

$$FM = \beta_{FM}\left(I_1 + I_2 + I_3 + I_4 \right), \qquad (6)$$

where β_{FM} – weight of the resource group "Material Resources" of the socio-economic potential of health insurance.

$$FT = \beta_{FT}\left(I_5 + I_6 + I_7 + I_8 + I_9 \right), \qquad (7)$$

where β_{FT} – weight of the resource group "Human Resources" of the socio-economic potential of health insurance.

$$GF = \beta_{GF}\left(I_{10} + I_{11} + I_{12} \right), \qquad (8)$$

where β_{GF} – weight of the resource group "Public Financial Resources" of the socio-economic potential of health insurance.

$$MRF = \beta_{MRF}\left(I_{13} + I_{14} + I_{15} + I_{16} + I_{17} + I_{18} \right), \quad (9)$$

where β_{MRF} – weight of the resource group "Financial Resources of Health Insurance Companies " of the socio-economic potential of health insurance.

$$SR = \beta_{SR}\left(I_{19} + I_{20} + I_{21} + I_{22} \right), \qquad (10)$$

where β_{SR} – weight of the resource group "Financial Resources of Insured (Individuals and Legal Entities)" of the socio-economic potential of health insurance.

The level of the socio-economic potential of health insurance $\left(LMI \right)$ is determined by the following formula:

$$LMI = \frac{FM + FT + GF + MRF + SR}{5}, \qquad (11)$$

The calculation formulae for these indicators are as follows:

The return on investment in medical equipment in the health care sphere I_1:

$$I_1 = \frac{VS}{Coz}, \qquad (12)$$

where VS – amount of health care services provided, Coz – average annual value of fixed assets.

The actual volume of medical equipment per unit of labor – I_2:

$$I_2 = \frac{Coz}{N}, \qquad (13)$$

where N – average annual headcount of health care workers.

The bed population ratio in health care facilities per 10 thousand population – I_3:

$$I_3 = \frac{LFv}{LF}, \qquad (14)$$

where LFv – actually used bedspace, LF – total bedspace.

The ratio of medical equipment wear in the health care sphere – I_4:

$$I_4 = \frac{D}{PCoz}, \qquad (15)$$

where D – total amount of medical equipment wear in the health care sphere, $PCoz$ – original value of medical equipment in the health care sphere.

The doctor ratio per 10 thousand population – I_5:

$$I_5 = \frac{ND}{NP} \cdot 10000, \qquad (16)$$

where ND – total number of doctors in Ukraine, NP – total population of the country.

The nursing staff ratio per 10 thousand population – I_6:

$$I_6 = \frac{Nsmp}{NP} \cdot 10000, \qquad (17)$$

where $Nsmp$ – total number of nursing staff in Ukraine.

The ratio of students of medical higher educational institutions of III-IV accreditation level per 10 thousand population – I_7:

$$I_7 = \frac{Nstud\left(III - IV\right)}{NP} \cdot 10000, \qquad (18)$$

where $Nstud\left(III - IV\right)$ – number of students of medical higher educational institutions of III-IV accreditation level.

The ratio of students of medical higher educational institutions of I-II accreditation level per 10 thousand population – I_8:

$$I_8 = \frac{Nstud\left(I - II\right)}{NP}, \qquad (19)$$

where $Nstud\left(I - II\right)$ – number of students of medical higher educational institutions of I-II accreditation level.

The proportion of medical higher educational institutions in the total number of higher educational institutions of III-IV accreditation level – I_9:

$$I_9 = \frac{NUn\left(med\right)}{NUn}, \qquad (20)$$

where $NUn\left(med\right)$ – number of medical higher educational institutions, NUn – total number of higher educational institutions.

The consolidated budget expenditures on health care per 1 inhabitant – I_{10}:

$$I_{10} = \frac{Ex\left(med\right)}{NP}, \qquad (21)$$

where $Ex\left(med\right)$ – total amount of health care costs.

The average monthly doctor salary – I_{11} (according to the data of the State Statistics Service).

The average monthly nursing staff salary – I_{12} (according to the data of the State Statistics Service).

The share of compulsory health insurance premiums in the total amount of insurance premiums – I_{13}:

$$I_{13} = \frac{CB\left(med\right)}{CB}, \qquad (22)$$

where $CB\left(med\right)$ – total amount of compulsory health insurance premiums, CB – total amount of insurance premiums.

The share of voluntary health insurance premiums in the total amount of insurance premiums – I_{14}:

$$I_{14} = \frac{CB\left(med\right)volun}{CB}, \qquad (23)$$

where $CB\left(med\right)volun$ – total amount of voluntary health insurance premiums.

The share of insurance indemnity under compulsory health insurance in the total amount of insurance indemnity – I_{15}:

$$I_{15} = \frac{II\left(med\right)}{II}, \qquad (24)$$

where $II\left(med\right)$ – amount of insurance indemnity under compulsory health insurance, II – total amount of insurance indemnity.

The share of insurance indemnity under voluntary health insurance in the total amount of insurance indemnity – I_{16}:

$$I_{16} = \frac{II(med)volun}{II}, \qquad (25)$$

where $II(med)volun$ – amount of insurance indemnity under voluntary health insurance.

The average ratio of insurance indemnity and insurance premiums under compulsory health insurance – I_{17}:

$$I_{17} = \frac{II(med)}{CB(med)}. \qquad (26)$$

The average ratio of insurance indemnity and insurance premiums under voluntary health insurance – I_{18}:

$$I_{18} = \frac{II(med)volun}{CB(med)volun}. \qquad (27)$$

The average monthly salary in the country per employee – I_{19} (according to the data of the State Statistics Service).

The ratio of average monthly salary and minimum salary – I_{20}:

$$I_{20} = \frac{\overline{S}}{MinS}, \qquad (28)$$

where $\overline{S}$ – average monthly salary per employee, $MinS$ – average minimum salary.

The ratio of average monthly salary and minimum cost of living established by law – I_{21}:

$$I_{21} = \frac{\overline{S}}{Subsis}, \qquad (29)$$

where $Subsis$ – average monthly cost of living established by law.

The proportion of health insurers in the total number of insured – I_{22}:

$$I_{22} = \frac{Nsgms}{Nsg}, \qquad (30)$$

where $Nsgms$ – number of health care insurers, Nsg – total number of insurers.

The socio-economic potential of health insurance has been structured by the corresponding types (absolute, normal, unstable and crisis), and their threshold values, which are given in Table 1, have been determined.

Table 1. Threshold values of the socio-economic potential type of health insurance

Type name	Conventional symbol	Threshold values
Absolute	FP_A	≥ 1
Normal	FP_N	[0.7, 1.0)
Unstable	FP_S	[0.4, 0.7)
Crisis	FP_K	[0.1, 0.4)
Catastrophic	FP_{KAT}	[–1.0, 0.1)

The level of socio-economic potential, the assessment of which is shown in Table 2, is determined depending on the socio-economic potential type of health insurance.

Table 2. Assessment of the socio-economic potential of health insurance

Level name	Conventional symbol	Threshold values
High	LMI_V	≥ 1
Average	LMI_C	[0.7, 1.0)
Satisfactory	LMI_R	[0.4, 0.7)
Low	LMI_B	[0.1, 0.4)
Very low	LMI_{SB}	[–1.0, 0.1)

It is expedient to assess and determine the socio-economic potential level for each potential resource block, since different indicators have different directions of the dynamics that excludes the possibility of its definite assessment. The block assessment of the socio-economic potential of health insurance provides the comprehensive information on the dynamics of individual indicators and focus of the health care sphere. The assessment has different focus of the performance changes: some of them characterize the positive dynamics of the indicators, while others show a decrease in the performance. In this case, it is difficult for analysts to evaluate the performance in general, using only information on the single and block assessment of the indicators. Therefore, it is expedient to calculate the integrated assessment of the socio-economic potential of health insurance, where the outcomes of all main aspects of the health care sphere are reflected. Moreover, this assessment is of more interest to the public financial management than the single assessment.

3. RESULTS

3.1. Descriptive statistical analysis

An array of source data formed in accordance with the system of indicators is specified by the value of standard variance. As shown in Table 3, the change in values of the indicators used to assess the socio-economic potential of health insurance is multidirectional.

The study has shown that different values of the socio-economic potential of health insurance have different dynamics that excludes the possibility of its unambiguous assessment. Therefore, it is expedient to assess and determine the level of the socio-economic potential for each block of potential resources.

3.2. Calculation of the socio-economic potential of health insurance

3.2.1. An array of indicators of the material resource management

As shown in Table 4, the level of the socio-economic potential of an array of indicators of the material resource management changes in the dynamics unevenly – with a reduction in 2012–2015, and a growth in 2016–2017. Despite a certain growth in 2016–2017, the value of this indicator is critical (< 0.4). Therefore, it is essential to increase the level of provision of healthcare personnel with new medical equipment, etc.

Table 3. An array of source data for assessment of the socio-economic potential of health insurance by a discriminative model/specified values

Indicators	Years							
	2010	2011	2012	2013	2014	2015	2016	2017
I_1	–1.17	–0.87	–0.91	–0.37	0.04	0.72	1.08	1.48
I_2	–1.12	–0.96	–0.58	–0.29	–0.09	0.24	0.97	1.84
I_3	1.76	1.03	0.09	–0.43	–0.01	–0.43	–0.53	–1.47
I_4	1.08	1.65	0.19	0.29	–0.51	–1.31	–0.83	–0.55
I_5	–1.50	–1.24	–0.71	0.19	0.98	0.75	0.78	0.74
I_6	0.89	0.94	1.07	0.01	0.01	–0.09	–1.14	–1.69
I_7	1.28	0.99	0.65	0.32	–0.10	–0.53	–1.02	–1.59
I_8	1.28	0.99	0.65	0.32	–0.10	–0.53	–1.02	–1.59
I_9	2.06	0.84	–0.19	0.06	–0.57	–0.69	–0.94	–0.57
I_{10}	–1.09	–0.91	–0.71	–0.44	–0.09	0.49	1.05	1.71
I_{11}	–1.08	–0.95	–0.78	–0.38	–0.05	0.45	1.17	1.62
I_{12}	–1.08	–0.95	–0.78	–0.38	–0.05	0.45	1.17	1.62
I_{13}	1.19	1.19	0.84	–0.18	0.06	–0.61	–1.24	–1.24
I_{14}	–1.19	–1.19	–0.84	0.18	–0.06	0.61	1.24	1.24
I_{15}	0.25	0.25	0.07	0.55	1.57	0.15	–1.43	–1.43
I_{16}	–0.25	–0.25	–0.07	–0.55	–1.57	–0.15	1.43	1.43
I_{17}	–1.12	–1.12	–1.37	0.61	0.68	0.91	0.70	0.70
I_{18}	1.52	1.52	–0.22	0.13	–0.65	–0.54	–0.89	–0.89
I_{19}	–1.12	–0.98	–0.76	–0.40	0.00	0.52	1.29	1.46
I_{20}	–1.06	–1.15	–0.28	–0.51	0.13	1.36	1.53	–0.02
I_{21}	–1.46	–1.05	–0.59	–0.13	0.37	0.92	1.49	0.46
I_{22}	0.32	0.69	1.44	0.68	0.19	–0.82	–1.09	–1.41

Table 4. Calculation of the socio-economic potential of health insurance/an array of indicators of the material resource management (specified values)

	Indicators	2010	2011	2012	2013	2014	2015	2016	2017
I_1	Return on investment in medical equipment in the health care sphere	−1.17	−0.87	−0.91	−0.37	0.04	0.72	1.08	1.48
I_2	Actual volume of medical equipment per unit of labor	−1.12	−0.96	−0.58	−0.29	−0.09	0.24	0.97	1.84
I_3	Bed population ratio in health care facilities per 10 thousand population	1.76	1.03	0.09	−0.43	−0.01	−0.43	−0.53	−1.47
I_4	Ratio of medical equipment wear in the health care sphere	1.08	1.65	0.19	0.29	−0.51	−1.31	−0.83	−0.55
	β_{FM}	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	An array of indicators	0.08	0.13	−0.18	−0.12	−0.09	−0.12	0.10	0.19

3.2.2. An array of indicators of the human resource management of socio-economic potential

As shown in Table 5, the level of the socio-economic potential of an array of indicators of the material resource management is negatively changing in the range of 0.71 in 2010 to −1.06 in 2017. This array has a negative impact on the level of the socio-economic potential of health insurance in Ukraine, therefore it is essential to immediately address the issues of training and provision of health care personnel.

3.2.3. An array of indicators of the public financial resource management of socio-economic potential

As shown in Table 6, the level of the socio-economic potential of an array of indicators of the public financial resource management is growing in the range of 0.97 in 2010 to 1.48 in 2017. Despite a certain growth since 2010, the value of this indicator should not be reduced. That is, it is essential at least to keep the pace of the public financial resource management.

Table 5. Calculation of the socio-economic potential of health insurance/an array of indicators of the human resource management of socio-economic potential (specified values)

	Indicators	2010	2011	2012	2013	2014	2015	2016	2017
I_5	Doctor ratio per 10 thousand population	−0.79	−0.54	−0.02	0.84	1.61	0.40	0.10	−1.61
I_6	Nursing staff ratio per 10 thousand population	0.89	0.94	1.07	0.01	0.01	−0.09	−1.14	−1.69
I_7	Ratio of students of medical higher educational institutions of III-IV accreditation level per 10 thousand population	1.28	0.99	0.65	0.32	−0.10	−0.53	−1.02	−1.59
I_8	Ratio of students of medical higher educational institutions of I-II accreditation level per 10 thousand population	1.28	0.99	0.65	0.32	−0.10	−0.53	−1.02	−1.59
I_9	Proportion of medical higher educational institutions in the total number of higher educational institutions of III-IV accreditation level	2.06	0.84	−0.19	0.06	−0.57	−0.69	−0.94	−0.57
	β_{FT}	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	An array of indicators	0.71	0.48	0.32	0.23	0.13	−0.22	−0.60	−1.06

Table 6. Calculation of the socio-economic potential of health insurance/an array of indicators of the public financial resource management of socio-economic potential (specified values)

	Indicators	2010	2011	2012	2013	2014	2015	2016	2017
I_{10}	Consolidated budget expenditures on health care per 1 inhabitant	−1.09	−0.91	−0.71	−0.44	−0.09	0.49	1.05	1.71
I_{11}	Average monthly doctor salary	−1.08	−0.95	−0.78	−0.38	−0.05	0.45	1.17	1.62
I_{12}	Average monthly nursing staff salary	−1.08	−0.95	−0.78	−0.38	−0.05	0.45	1.17	1.62
	β_{GF}	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	An array of indicators	−0.97	−0.84	−0.68	−0.36	−0.06	0.42	1.02	1.48

Table 7. Calculation of the socio-economic potential of health insurance/an array of indicators of the management of financial resources of health insurance companies of socio-economic potential (specified values)

	Indicators	2010	2011	2012	2013	2014	2015	2016	2017
I_{13}	Share of compulsory health insurance premiums in the total amount of insurance premiums	1.19	1.19	0.84	−0.18	0.06	−0.61	−1.24	-1.24
I_{14}	Share of voluntary health insurance premiums in the total amount of insurance premiums	−1.19	−1.19	−0.84	0.18	−0.06	0.61	1.24	1.24
I_{15}	Share of insurance indemnity under compulsory health insurance in the total amount of insurance indemnity	0.25	0.25	0.07	0.55	1.57	0.15	−1.43	-1.43
I_{16}	Share of insurance indemnity under voluntary health insurance in the total amount of insurance indemnity	−0.25	−0.25	−0.07	−0.55	−1.57	−0.15	1.43	1.43
I_{17}	Average ratio of insurance indemnity and insurance premiums under compulsory health insurance	−1.12	−1.12	−1.37	0.61	0.68	0.91	0.70	0.70
I_{18}	Average ratio of insurance indemnity and insurance premiums under voluntary health insurance	1.52	1.52	−0.22	0.13	−0.65	−0.54	−0.89	-0.89
β_{MRF}		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
An array of indicators (financial)		0.08	0.08	−0.32	0.15	0.01	0.07	−0.04	−0.04

3.2.4. An array of indicators of the management of financial resources of health insurance companies of socio-economic potential

As shown in Table 7, the level of the socio-economic potential of an array of indicators of the management of financial resources of health insurance companies is changing in the dynamics unevenly, with a downward trend since 2013. The value of this indicator is catastrophic (<0). Therefore, the state should create the conditions necessary for the development of health insurance in general and medical (both voluntary and compulsory) in particular.

3.2.5. An array of indicators of the management of insurers' financial resources of socio-economic potential

As shown in Table 8, the level of the socio-economic potential of an array of indicators of the management of insurers' financial resources is growing in the range of 0.66 in 2010 to 0.64 in 2016, but in 2017 its value decreased to 0.10, that is, from a satisfactory level to a critical one. Despite a strong growth since 2010, the value of this indicator should not be reduced. Therefore, it is essential at least to keep the rate of management of insurers' financial resources in 2016.

Thus, there are some positive changes in the socio-economic potential of health insurance, as its comprehensive assessment gradually increased until 2016 inclusively. This has been facilitated by some positive changes in relation to its individual arrays. At the same time, the change in the level of the socio-economic potential has been positively influenced by such components as the management of material resources, the management of public financial resources and financial resources of insurers. At the same time, such positive changes have been to some extent offset by a negative im-

Table 8. Calculation of the socio-economic potential of health insurance/an array of indicators of the management of insurers' financial resources of socio-economic potential (specified values)

	Indicators	2010	2011	2012	2013	2014	2015	2016	2017
I_{19}	Average monthly salary per employee in the country	−1.12	−0.98	−0.76	−0.40	0.00	0.52	1.29	1.46
I_{20}	Ratio of average monthly salary and minimum salary	−1.06	−1.15	−0.28	−0.51	0.13	1.36	1.53	-0.02
I_{21}	Ratio of average monthly salary and minimum cost of living established by law	−1.46	−1.05	−0.59	−0.13	0.37	0.92	1.49	0.46
I_{22}	Proportion of health insurers in the total number of insured	0.32	0.69	1.44	0.68	0.19	−0.82	−1.09	-1.41
β_{SR}		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
An array of indicators		-0.66	−0.50	−0.04	−0.07	0.14	0.40	0.64	0.10

pact of the management of human resources and financial resources of health insurance companies.

The block assessment of the financial potential of health insurance gives the complete information on the dynamics of individual indicators and trends of the branch. However, as can be seen from the results of the performed analysis, the assessment has different focus of the performance changes: some of them characterize the positive dynamics of the indicators, while others show a decrease in the performance. In this case, it is difficult for analysts to evaluate the performance in general, using only information on the single and block assessment of the indicators. Therefore, it is expedient to calculate the integrated assessment of the socio-economic potential of health insurance, where the outcomes of all main aspects of the health care sphere are reflected. Moreover, this assessment is of more interest to the public financial management than the single assessment.

Using this model, it is possible to compare the efficiency of use of the health insurance resources in time, thereby affecting the existing socio-economic potential and changing each component thereof.

CONCLUSION

Given the dynamics of assessment of the socio-economic potential of health insurance, it is arguable that the health insurance in Ukraine has a sufficient internal potential for its development. However, having such internal potential, the branch has additional opportunities for its strengthening, the development of which the system of management of the socio-economic potential of health insurance should be aimed at.

The proposed model of diagnostics of the socio-economic potential of health insurance has the following positive characteristics:

- a set of input variables, inclined to be analyzed for multicollinearity was used when building the model of diagnostics of the socio-economic potential of health insurance in order to remove unnecessary factors and to provide the possibility of drawing the adequate conclusions on the results of the correlation between variables. The above has resulted in obtaining the model with a set of the independent and most informative impact factors. This has enabled to identify and assess the problems of the effective management of the socio-economic potential of health insurance;

- the model performance analysis makes it possible to reveal significant non-conformity of the previously developed discriminant models to the national economy environment, and to improve the accuracy of diagnosis of the socio-economic potential of health insurance;

- the proposed approach to the development of the model of diagnostics of the socio-economic potential of health insurance is free of any deficiencies inherent in other approaches in the context of the transition economies as it enables to take into account the business specificity in health insurance, and retains its stability in time. This stability is achieved by means of its own integrated financial assessment. All of this suggests that the proposed model of diagnostics of the socio-economic potential of health insurance will retain its relevance until the legislative base in the sphere of health insurance undergoes dramatic changes that in this case would result in another selection of impact factors and the reconfiguration of the model parameters.

The proposed approach to the development of the model of diagnostics of the socio-economic potential gives the opportunity to develop the appropriate models in other branches of insurance according to the specifics of the object insured.

REFERENCES

1. Alexandersen, N., Anell, A., Kaarboe, O., Lehto, J. S., Tynkkynen, L.-K., & Vrangbæk, K. (2016). The development of voluntary private health insurance in the Nordic countries. *Nordic Journal of Health Economics, 4*(1), 68-83. http://dx.doi.org/10.5617/njhe.2718

2. Chen, C., Weider, K., Konopka, K., & Danis, M. (2014). Incorporation of Socio-economic Status Indicators into Policies for the Meaningful Use of Electronic Health Records. *Journal of Health Care for the Poor and Underserved, 25*(1), 1-16. https://doi.org/10.1353/hpu.2014.0040

3. Chkan, I., & Rubtsova, N. (2015). Current state of the health insurance market in Ukraine: challenges and opportunities. *Financial Space, 4*(20), 157-172.

4. Demchenko, O. (2016). Pragmatics of financial security of health insurance in Ukraine. *Young Scientist, 10*(37), 363-368.

5. Farrah, Lu. A. (2013). *Competition and Growth Potential in Health Insurance Markets*. Mark Farrah Associates. Retrieved from http://www.markfarrah.com/healthcare-business-strategy/Competition-and-Growth-Potential-in-Health-Insurance-Markets.aspx

6. Hamel, L., Firth, J., Levitt, L., Claxton, G., & Brodie, M. (2016). *Survey of Non-Group Health Insurance Enrollees, Wave 3*. Kaiser Family Foundation. Retrieved from https://www.kff.org/health-reform/poll-finding/survey-of-non-group-health-insurance-enrollees-wave-3

7. Internet journal "On Insurance" (n.d.). *Statistics of the insurance market of Ukraine*. Retrieved from https://forinsurer.com/stat

8. Jasinski, L. (2015). Conditions for Development of the Private Health Insurance in Poland. *Journal of US-China Public Administration, 12*(2), 153-165.

9. National Health System Reforming Strategy for Ukraine 2015–2020. Retrieved from http://healthsag.org.ua/wp-content/uploads/2014/11/Strategiya_UKR.pdf

10. Official website of the National Commission (n.d.). *Carrying out the government regulation in the sphere of financial services markets*. Retrieved from http://nfp.gov.ua/

11. Ponomarenko, K., & Marchenko, O. (2014). Current status and prospects of health insurance in Ukraine. *Scientific Bulletin of Kherson State University, 1*(5), 326-331.

12. The American Academy of Actuaries. Individual and Small Group Markets Committee (2017). *An Evaluation of the Individual Health Insurance Market and Implications of Potential Changes*. Retrieved from https://www.actuary.org/files/publications/Acad_eval_in-div_mkt_011817.pdf

13. Veugelers, P. J., & Yip, A. M. (2013). Socioeconomic disparities in health care use: Does universal coverage reduce inequalities in health? *Journal of Epidemiology and Community Health, 57,* 424-428.