

The Scale Measurement of the Main Indicators of Capitalization of the Insurance Market (on the Example of Ukraine)

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Abstract—This article describes that the level of capitalization of the insurance market is an essential indicator for assessment its level of development, the monitoring introduction of which will help to provide the effective tools for problem-solving monitoring of risks and supervision in the insurance market. It is indicated (using the T. Saaty hierarchy analysis method) that there are three the most important objectives of the state regulation of the insurance market of Ukraine: to improve the regulation of the insurance market, accordance to the indicators of capitalization of insurers; to restoration of confidence in insurance companies and consumer protection insurance service and bringing the legislation on insurance companies regulation into EU directives. The most important indicators of the level of capitalization of the insurance market (on the example of Ukraine) for 2009-2017 years are analyzed. It has been indicated that the problem of finding sources of capital increase for insurance companies is a very important; therefore state supervision should focus on maintaining strength, reliability and adequate capital. It is identified that for the insurance market of Ukraine, the helpful practice will be an increase the share of authorized capital in the structure of own funds, which is a constructive factor. So, the criteria and the scale (interval) for indicators of capitalization of the Ukrainian insurance market ("The share of equity ratio" and "The share paid authorized capital ratio"), were developed for the insurance market of Ukraine in general sector, non-life and life sectors. The criteria improved the practical support for assessment the development of the insurance market and describe the level of capitalization of the insurance market at five levels.

Keywords—scale; level; capitalization; state regulation; supervision; assessment; insurance market

I. INTRODUCTION

Stimulation of the insurance market, maintaining its stability, reliability of the insurers is the strategic task of the state. The Comprehensive Program for the Development of

the Financial Sector of Ukraine until 2020 [1], The Association Agreement between Ukraine, on the one hand and the European Union, the European Atomic Energy Community and their Member States, on the other hand [2], Concept of establishment of prudential supervision of nonbank financial institutions [3] are responsible for the development of methods of evaluating the effectiveness of state regulation of the insurance. Due to the globalization and integration processes in Ukraine, insurance companies are particularly concerned about capitalization. Practical tools for ensuring an adequate level of capitalization are requirements for the authorized capital of a financial institution, which is especially relevant when approaches of domestic and European regulators to its formation converge.

For example, according to the Comprehensive Comparative Legal Study of Certain Aspects of Financial Services Regulation in Ukraine and the EU [4], the requirements of the Solvency II about required minimum capital, which should have an absolute lower level of 2.2 million Euros for insurance companies other than life insurance, 3.2 million Euros for life insurance companies, 3.2 million Euros for reinsurance companies, except of controlled reinsurance companies, which should have the minimum capital not less than 1 million Euros. If the insurance company does not comply with the minimum standards specified above, the insurance company's license must be canceled. Equity provides solvency of an insurance company, creates conditions for its further development in quantitative directions.

II. LITERATURE OVERVIEW

Ensuring the stability of the development of the insurance market is essentially due to its effective state regulation. Most experts associate the problem of state regulation with the licensing and inspecting the insolvency of insurers. In studies devoted to the essence of state regulation, it is mainly noted that the basis are the administrative, economic and

legal influence tools. Determination of the current state and basic directions of the development of the insurance market becomes of particular relevance, especially in the field of state regulation.

It should be noted that the problems of the formation and development of the insurance market are devoted to the work of scientists: A. Bojko (2011) [5], J. Dyachkova (2010) [6], M. Hudakova and J. Adamko (2016) [7], N. Tkachenko (2009) [8], J. Cai, C. Lemieux, F. Liu [9], etc. The problems of assessment methodology and mechanism to ensure financial stability of insurance companies in Ukraine using reinsurance were offered in the works [5]; [6]; [8]. The scientists were considered the effectiveness of the activity of insurance companies. The research [7] conducted analysis of insurance regulation, which should provide protection of policyholders and beneficiaries while promoting market stability through valuation and risk efficient capital allocation. Canadian researchers [9] assumed that the initial capital or reserve of a reinsurer is regulated by the value-at-risk of its promised indemnity. However, the theoretical and methodological support for assessing the effectiveness of state regulation of the insurance market development accordance to the scale measurement of the main indicators of capitalization of the insurance market in Ukraine is not sufficiently developed. This necessitates the development of methodological approaches and practical recommendations for assessing the effectiveness of state regulation thought the main indicators of capitalization, which proves the relevance of the topic of research. The expediency of solving this problem and its inadequate theoretical and methodological justification led to the choice of the objectives of the study.

III. GOAL AND TASKS OF THE RESEARCH

The goal of the research is to provide the scale measurement of the main indicators of capitalization of the insurance market (on the example of Ukraine).

According to the research goal, the following units are set: to solve the problems, the following methods are used: T. Saaty hierarchy analysis method (to determine the priority of the goals of the Ukrainian insurance market development), to improve the methodical provision of an assessment of the effectiveness of the state regulation of the development of the insurance market by the indicators of the capitalization of insurers. Applied aspects of the development of methods for assessing the effectiveness of state regulation of the development of the insurance market are investigated based on the existing regulatory framework, the processing of information carried out using the package Microsoft Office Excel 2007 and other software. The information basis for the study was the legal and regulatory framework of Ukraine on insurance regulation: normative acts, orders and statistical data of state regulation bodies.

IV. METHODOLOGY

Government regulation of the insurance market – a targeted and consistent application of measures for state establish an effective system civil relations of the insurance market to enhance the security of property interests of insurers, increasing the investment potential of the insurance industry.

The issue of state regulation of the insurance market as a prerequisite for provision of insurance regulation in the

context of insurance relationships needs further study. Interaction of insurance subjects occurs through the insurance market, the development of which is important for the state development as a whole. There are a number of factors that influence the development of the Ukrainian insurance market: factors that are related to the demand for insurance products and related to the activities of insurance companies. The existence of external factors is the result of insufficient efficiency of state regulation of insurance activity, and the presence of internal - depends exclusively on the policies and management of insurance companies

The state's influence on the insurance market is mainly due to the formation of the legislative and regulatory framework of the activity of participants in the insurance market and involves the choice of the model of state regulation.

Improving the existing model of state regulation of the insurance market development is possible when choosing alternatives to ensure its effective state regulation.

For the development of the insurance market of Ukraine, it is extremely important to have professionally organized regulation, objective supervision and control by qualified specialists, which will ensure the enhancement of the competitiveness of financial institutions, which is possible through the modeling of the state regulation process. Strengthening of the insurance market of Ukraine is limited without a deep analysis of its current state, the identification of unresolved issues and problems; therefore, the level of efficiency of functioning of the national economy as a whole depends on the sensitivity and timeliness of determining the main directions of its development.

In determining alternatives to ensure effective state regulation of the development of the insurance market of Ukraine, the method of analysis of hierarchies (MAI method) [10] was used. Experts were the representatives of insurance companies of Ukraine, the opinions of experts are agreed, since the ratio of consensus expert opinions is less than 10% [10].

The assessment of the priority of the goals of the Ukrainian insurance market development is presented in the Table I.

Results in the Table I indicate that the three most important objectives of the state regulation of the insurance market of Ukraine, which according to the rank have 1st-3rd place: the improvement of regulation of the insurance market in accordance with the indicators of capitalization of insurers – 1st place (0.324), the restoration of confidence in insurance companies and consumer protection insurance services – 2nd place (0.287), bringing the legislation on insurance companies regulation into EU directives in line with the 3rd place (0.184). However, another unresolved problem is the analysis of the current state and development of the insurance market and the identification of its trends. The insurance market is characterized by the following indicators: the total amount of gross insurance premiums; total amount of gross insurance indemnities (payments); level of payments; coefficient of concentration of the insurance market; the ratio of the amount of gross premiums to GDP; prize per capita; per capita payments.

TABLE I. PRIORITY GOALS OF THE INSURANCE MARKET OF UKRAINE

Objectives of the insurance market of Ukraine	Assessment of the effectiveness of the state regulation of the insurance market	Implementation of Prudential Supervision	Strengthening the quality of state regulation of the insurance market	Priority
	0.366	0.305	0.329	
Adapt the legislation on the regulation of insurance companies to the EU directives	0.257	0.137	0.147	0.184
Introduction of a new taxation system for insurers' profits	0.095	0.060	0.060	0.073
Prevent the use of the insurance industry in money laundering	0.040	0.043	0.043	0.042
Development of the infrastructure of the insurance market	0.066	0.103	0.103	0.089
Improving the regulation of the insurance market in accordance with the indicators of capitalization of insurers	0.150	0.424	0.426	0.324
Restoration of trust in insurance companies and protection of insurance services consumers' rights	0.393	0.234	0.220	0.287

Source: The author's development, using the method of MAI

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insurance market; the ratio of the amount of gross premiums to GDP; prize per capita; per capita payments.

Another indicator of the insurance market is an indicator concentration (monopolization). assessing the state market concentration (monopolization) insurance market in Ukraine shown in Table II. The received data in the Table II shows that increased tendency to monopolize the insurance market. These values of the concentration ratio allow us to make a conclusion that the market is monopolized by the top-50 insurance companies which actually represent almost all insurance market of Ukraine. Thus, the analysis of the Ukrainian insurance market made it possible to determine that there is currently a reduction in the number of insurance companies, indicating inefficiency of the activity and a high level of their loss-making.

TABLE II. DYNAMICS OF INDICATORS OF MARKET CONCENTRATION (MONOPOLIZATION) OF INSURANCE MARKET IN UKRAINE

Years	General insurance (non-life)			Life insurance (life)		
	The number of insurers	The share of the first 10 insurers%	The share of the top 50 insurers%	The number of insurers	The share of the top 3 insurers%	The share of the top 10 insurers%
2004	342	22.6	83.0	45	56.3	93.0
2005	348	12.5	75.5	50	52.1	91.2
2006	356	12.2	74.7	55	58.5	90.1
2007	381	12.6	74.4	65	52.1	86.4
2008	396	29.3	72.7	73	51.2	83.3
2009	403	29.3	75.2	72	54.3	80.9
2010	381	33.1	76.5	70	50.1	83.3
2011	378	34.4	76.8	64	51.3	87.1
2012	352	28.6	70.8	62	44.0	90.4
2013	345	30.7	77.5	62	51.7	90.9
2014	325	35.0	78.8	57	44.8	91.2
2015	312	36.3	85.0	49	42.8	87.9
2016	271	44.6	85.9	39	43.0	89.4
2017	261	43.8	88.0	33	21.3	95.9

Source: author's development based on source [11]

The main macroeconomic indicators of the Ukrainian insurance market are presented in Table III.

TABLE III. THE DYNAMICS OF MACROECONOMIC INDICATORS OF THE INSURANCE MARKET OF UKRAINE

Indicator	Values for years									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
The share of gross premiums in GDP,%	2.53	2.24	2.13	1.74	1.52	1.96	1.71	2.08	1.48	1.46
The share of gross premiums (non-life) in GDP,%	2.42	2.15	2.05	1.64	1.40	1.79	1.57	1.93	1.36	1.36
The share of gross premiums (life) in GDP,%	0.12	0.09	0.08	0.10	0.13	0.17	0.14	0.15	0.12	0.10
Total gross premiums per capita USD	519	443	503	495	472	630	590	693	826	1025
Total gross premiums per capita (non-life), USD	495	425	483	466	432	575	542	642	761	956
Total gross premiums per capita (life), USD	24	18	20	29	40	54	48	51	65	69

Source: Author's development based on sources [11]; [12]

As it was shown in the Table III, the amount of gross premiums per capita is quite low compared with other countries. In addition, the insurance market's contribution to GDP is also low. The obtained results testify to the need to implement tactical and strategic measures of state regulation

of the development of the insurance market to change the negative trend in the future. The main indicators of capitalization of the insurance market of Ukraine are presented in Table IV.

TABLE IV. INDICATORS OF CAPITALIZATION OF INSURANCE MARKET IN UKRAINE

Indicator	Values for years								
	2009	2010	2011	2012	2013	2014	2015	2016	2017
Equity	n/a	26164	30875.2	33355.6	40207.6	34597.7	34825.7	n/a	n/a
Equity (non-life)	n/a	24092.2	28304.3	30913.8	37478.8	32037.4	32015.7	n/a	n/a
Equity (life)	n/a	2071.8	2570.9	2441.8	2728.8	2560.3	2810	n/a	n/a
Total number of insurers	450	456	442	414	407	382	361	310	294
Number of insurers (non-life)	378	389	378	352	345	325	312	271	261
Number of insurers (life)	72	67	64	62	62	57	49	39	33
Assets on the balance sheet	41970	45234.6	48122.7	56819.9	66387.5	70261.2	60729	56075.6	57381.0
Assets on the balance sheet (non-life)	n/a	36907.7	42721.6	50653.1	59358.3	49408.3	50544.6	n/a	n/a
Assets on the balance sheet (life)	n/a	8326.9	5401.1	6166.8	7029.2	20852.9	10184.5	n/a	n/a
Equity at 1 insurance company mln. UAH / Person	n/a	57.38	69.85	80.57	98.79	90.57	96.47	n/a	n/a
Equity at 1 insurer (non-life). mln. USD / Person	n/a	61.93	n/a	87.82	108.63	98.58	102.61	n/a	n/a
Equity at 1 insurance company (life). mln. USD / Person	n/a	30.92	40.17	39.38	44.01	44.92	57.35	n/a	n/a
The share of equity ratio, %	n/a	57.84	64.16	58.70	60.57	49.24	57.35	n/a	n/a
The share of equity in assets (non-life), %	n/a	65.28	n/a	61.03	63.14	n/a	63.34	n/a	n/a
The share of equity in assets (life), %	n/a	24.88	47.60	39.60	38.82	12.28	27.59	n/a	n/a

*n/a – not available,

Source: Author's development based on sources [11]

As it was shown in the Table IV, starting in 2010 the National Commission (National Commission for the state regulation of financial services markets in Ukraine) for the regulation of financial services markets in Ukraine issued data on the size of insurers' equity and assets for the life insurers and companies other than life insurance.

The rational use information of the value of capitalization of insurers (equity equity) is possible only if it is transformed into a form that is suitable for further analysis aimed at making decisions by the heads of insurance companies by the National Commission (National Commission for the state regulation of financial services markets in Ukraine) that carries out state regulation in the financial markets services of Ukraine and consumers of insurance services. According to the results of calculations of the capitalization of insurers established: these indicators are not distributed by Gauss law, which indicates the asymmetry of their distribution. There is a difference of values of the mode, the median and the average value. To provide greater information content and this indicator thresholds to determine its built interval scale.

To build the scale interval authors used rule of "three sigma", which says that the 97,7 – 97,8 % of the total value features provided its normal distribution in the range of plus / minus three values standard deviation of the sample from its average value. Methods of construction of interval scales are based on the axiom of normality.

The indicators in the economy are distributed by the normal law of Gauss, when extreme intensity index less common than intensity, close to the average. In most cases the indicators not distributed by the normal law, indicating the need for factor correction.

Thus, the basic steps of building interval scale of indicators of capitalizations of insurance market include: checking normality of distribution of the indicators; in the case of normal compliance of the distribution of the scale indicator for the rule of "three sigma", which have a range of

values (-3σ ; $+3\sigma$); in case of deviation of the distribution of the normal law and the presence of asymmetry of the scale is also carried by the rule of "three sigma", but as starting point is taken either arithmetic mean or mode variation range, or median, and use correction factor [13].

For this purpose the scale measurement was done, taking into account the correction coefficient for the right-hand and left-sided asymmetry of the distribution of the values of the indicators with the methods of constructing interval scales are based on the axiom of normality. The scales and criteria of indicators of capitalization of insurers (that developed by S. Achkasova) are shown in the Table V.

TABLE V. SCALES AND CRITERIA OF INDICATORS OF CAPITALIZATION OF THE INSURANCE MARKET OF UKRAINE

Designation index	Criteria for capitalization indices insurance market in Ukraine:				
	very low	low	average	high	very high
The share of equity ratio, %	[0; 49.63)	[49.63; 54.16)	[54.16; 58.72)	[58.72; 58.73)	[58.73; 100)
The share of equity ratio (non-life), %	[0; 60.31)	[60.31; 62.2)	[62.2; 64.11)	[64.11; 64.13)	[64.13; 100)
The share of equity ratio (Life), %	[0; 5.56)	[5.56; 7.55)	[7.55; 19.77)	[19.77; 29.98)	[29.98; 100)
The share paid authorized capital ratio, %	[0; 20.63)	[20.63; 25.51)	[25.51; 30.46)	[30.46; 30.53)	[30.53; 100)
The share paid authorized capital ratio (non-life), %	[0; 24.45)	[24.45; 63.13)	[63.13; 68.78)	[68.78; 73.46)	[73.46; 100)
The share paid authorized capital ratio (life), %	[0; 11.71)	[11.71; 18.3)	[18.3; 25.31)	[25.31; 25.73)	[25.73; 100)

Source: developed by S. Achkasova

The received scales and criteria of indicators of capitalization of insurers in the Table V improved the methodological provision for assessing the effectiveness of

the state regulation of the insurance market development based on the proposed scales and criteria. However, not only the size of the authorized and equity capital of the insurer is an indicator of the effective formation of capital. The indicators of the capitalization of insurance companies at the micro level can be attributed: the growth rate of capitalization of insurance companies; the ratio of the capital of insurance companies to their assets; the ratio of the capital of insurance companies to their obligations; the ratio of insurers' capital to profit or loss; level of capital concentration of insurance companies; the ratio of domestic and foreign capital of insurers.

V. CONCLUSIONS

The methodological supports for assessing the effectiveness of state regulation of the insurance market development, accordance to the scale measurement of the main indicators of capitalization of the insurance market in Ukraine are determined. It is indicated (using the T. Saaty hierarchy analysis method) that there are three the most important objectives of the state regulation of the insurance market of Ukraine: the improvement of regulation of the insurance market accordance to the indicators of capitalization of insurers; the restoration of confidence in insurance companies and consumer protection the clients of insurance service; bringing the legislation on insurance companies regulation into EU Directives.

The most important indicators of the level of capitalization of the insurance market (on the example of Ukraine) for 2009-2017 years are analyzed. It has been indicated that the problem of finding sources of capital increase for insurance companies is a very important; therefore state supervision should focus on maintaining strength, reliability and adequate capital. It is identified that for the insurance market of Ukraine, the helpful practice will be an increase the share of authorized capital in the structure of own funds, which is a constructive factor.

The criteria and the scale (interval) for indicators of capitalization of the Ukrainian insurance market ("The share of equity ratio" and "The share paid authorized capital ratio"), were developed for the insurance market of Ukraine in general sector, non-life and life sectors. The criteria improved the practical support for assessment the development of the insurance market and describe the level of capitalization of the insurance market at five levels. To build the scale interval authors used rule of "three sigma", which says that the 97,7 – 97,8 % of the total value features provided its normal distribution in the range of plus / minus

three values standard deviation of the sample from its average value. The scientific results of this research have a scientific, methodical and practical means and can be used by state regulations in order to improve regulatory policy and prudential tools (for assessing the effectiveness of the state regulation of the insurance market development based on the proposed scales and criteria).

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