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Assessment of the Level of Socio-Economic Development of Regions and Their Insurance Markets Based on the Index Method (Russia)

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Abstract. The insurance market is one of the driving forces in the socio-economic development of the country. Therefore, the study of the level of development of the insurance market becomes an urgent problem both for countries with a stagnating economy and with a rapidly growing one. This is particularly true for countries with a transitive economy, as being unstable and subject to increased risks. The intentional development of the insurance market in these countries will increase financial stability and ensure the growth of their economies, thereby reducing the risks of the global economy. The article proposes a rating model that takes into account the key indicators of socio-economic development of regions, and indicators characterizing the level of development of the insurance market. It is based on the use of indices within the framework of the methodology used by the United Nations to evaluate countries using the integral indicator of “Human Development Index (HDI)”. The proposed model allows to quantify the level of development of specific regions and their insurance markets. The rating assessment model makes it possible to compare the level of socio-economic development of countries (regions) with the level of development of the insurance market and, therefore, to identify countries (regions) that have problems in the development of the insurance market. This assessment is the basis for the development of a set of measures that contribute to the development of regions and their insurance markets at the state and state-by-state levels as well.

Keywords: insurance market, insurance premiums, socio-economic development, depth of the insurance market, insurance density, level of payments, rating model, human development index, private indexes, integral index.

Research area: economy.

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Оценка уровня социально-экономического развития регионов и их страховых рынков на основе индексного метода (на примере России)

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Аннотация. Страховой рынок является одной из движущих сил в социально-экономическом развитии страны. Поэтому исследование уровня развития страхового рынка становится актуальной проблемой как для стран со стагнирующей экономикой, так и с быстро растущей. Особенно это актуально для стран с транзитивной экономикой как нестабильной и подверженной повышенным рискам. Целенаправленное развитие страхового рынка в этих странах позволит повысить финансовую устойчивость и обеспечить рост их экономики, тем самым создавая условия для снижения рисков глобальной экономики. В статье предложена рейтинговая модель, в которой учтены ключевые показатели социально-экономического развития регионов, и показатели, характеризующие уровень развития страхового рынка. Она основана на использовании индексов в рамках методики, используемой Организацией объединенных наций для оценки стран с помощью интегрального показателя «Индекс человеческого развития (ИЧР)». Предлагаемая модель позволяет количественно оценить уровень развития конкретных регионов и их страховых рынков. Модель рейтинговой оценки позволяет сопоставить уровень социально-экономического развития стран (регионов) с уровнем развития страхового рынка и на основе этого выявить страны (регионы), имеющие проблемы в развитии страхования страхового рынка. Эта оценка является основой для разработки комплекса мер, способствующих развитию регионов и страховых рынков на государственном и межгосударственном уровнях.

Ключевые слова: страховой рынок, страховые премии, социально-экономическое развитие, глубина страхового рынка, плотность страхования, уровень выплат, рейтинговая модель, индекс человеческого развития, частные индексы, интегральный индекс.

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Introduction

In modern economy the processes of globalization are intensifying, on the one hand, and the tendencies of regionalization are increasing, on the other hand. This is what makes it necessary to study regional problems of sustainable economic growth on a global scale and at the national level.

The insurance market is currently the most important driving force of the social and economic development of countries and regions, as well as a protective mechanism in the face of global risks. Therefore, the study of the level of its development, taking into account regional peculiarities, as well as quantitative and qualitative assessment, seems utterly relevant.

The authors take position on the fact that the assessment of the level of socio-economic development of regions and their insurance markets is quite relevant for countries with economies in transition. This is contingent on the evidence that these countries are characterized, on the one hand, by uneven development of various regions and, on the other hand, by the high development potential of both the regions themselves and their insurance markets, as well as the instability of the economy as a whole. The group of countries with economies in transition is quite numerous – this includes the states of Central and Eastern Europe, as well as the CIS countries – about 28 countries in total. The instability of the economic development in these countries affects the stability of the global financial system and economy. Therefore, considering the assessment of the level of socio-economic development of regions and their insurance markets with the help of the rating model proposed by the authors, it is very important to identify problem regions, the degree of disproportions in their development and, thereafter, to systematize the problems to be solved and further to conduct a comprehensive analysis in order to work out a system of measures that promote the development of

regions and insurance markets at the state and state-by-state levels.

The purpose of the article is to propose a model for assessing the level of socio-economic development of regions and their insurance markets in countries with transitive economies, as well as measures aimed at improving the indicators of the insurance markets.

The practical significance of the article consists in the possibility of using the proposed model by means of the example of any regional insurance markets in order to improve their interaction and to increase their role in the economy development. The proposed model itself is of general importance for assessing the development of the insurance market; its application is presented on the example of Russia.

The structure of the insurance market of the region and the level of its development are determined by the specifics of the functioning and development of a particular region. This specificity is shaped by the geographical location of the region, its climatic or demographic features, the presence or absence of natural resources, national characteristics, which together constitute the socio-economic development of the region.

The proposed model for assessing the level of socio-economic development of regions and their insurance markets succeeds in solving this problem. From the authors' perspective it could be used not only for intra-country regions, but also for regions as associations of several countries.

1. Literature Review

Various aspects of the problem under study are presented quite widely in the academic literature.

It is worth taking note of the works describing the problems of sustainable development of economic systems, and, the relationship between the indicators of the insurance market and the economic growth indicators in particular; as well as the importance of insur-

ance as an investment tool in the economy of any country, for example, (Lee H. S. et al., 2018) and (Njegomir and Stojic, (2010) and, in the economy of transition countries (Bayar et al., 2021), in particular.

Insurance acts as an institution of financial and social protection, and insurance companies (especially for long-term life insurance) are the most important and socially responsible investors, accounting for about 8–12 % of the total investments of developed countries in the economy (Prokopjeva et al., 2020), which, in turn, serves as a significant factor in economic growth (Sholoiko, 2018).

A number of authors have given evidence on the following research:

- there is a direct correlation between economic growth indicators and insurance market development indicators both in national economies (Kuznetsova and Pisarenko, 2016) and in regional integration complexes (Bezozyorov and Pisarenko, 2014);
- different types of grouped countries have different degrees of dependence between economic growth indicators and insurance market development indicators (Lee C.-C. et al., 2013), which is determined by historical, economic, spatial, geographical, regional (Prokopjeva, 2019) and geopolitical characteristics (Prokopjeva et al., 2020);
- close relationship between the indicators of economic development and growth of the countries under consideration and their insurance markets is ambiguous, due to the fact that the active growth of insurance is observed in countries with a high density and a significant proportion of the young population (Mdanat et al., 2019), as well as in countries with economies in transition (Kozarevic et al., 2013);
- reasons for similarities and differences in the studied relationships are diverse and determined by differences in the functioning of socio-economic systems (geographical, legislative, political, social, etc.) (PavicKramaric and Galetic, 2013), as well as the accepted model of insurance regulation (Mohyuldin, 2017) and regulation of applied innovative technologies (Porrini, 2017), (Rupeika-Apoga and Thalassinis, 2020);

- growth of the insurance market corresponds to the overall economic growth (Saksonova and Koleda, 2017), provided that investment activity is intensified (Saksonova, 2014) and risks are assessed (Oana and Daniela, 2016);

- life insurance shows a closer relationship with macroeconomic indicators compared to other segments of the insurance market (David Cummins and Rubio-Misas, 2021);

- various authors investigate various aspects of the development of insurance markets related to new trends in their development. Thus, a group of authors (Altarhouni et al., 2021) have been studying the role of insurance market development in environmental degradation, which is a new aspect of insurance research;

- interesting studies such as “Digital Technologies and Insurance Market in Russia” are devoted to various modern trends related to innovations in the insurance market that contribute to its development; the author of the given research concludes that digital technologies determine a new technological trend in the classical behavior of policyholders due to the heuristic choice of insurance services based on the use of digital technologies (Prosvetova, 2022). The use of digital technologies by insurance companies within the country aspect was investigated by Comanac et al., 2016. Thus, the aforementioned researchers and these ones as well (Laidroo et al., 2021) conclude that business models using Fin Tech contribute to the development of the financial and the insurance sectors. The authors (Salkovska et al., 2018) and (Batraga et al., 2018) believe that there are universal methods that influence the behavior of both consumers and companies providing services to them to develop companies in a variety of economic sectors, including, for example, the trading sector;

- finally, providing the research on insurance markets, the scientists suggest various models, for example, the dynamic panel threshold model, which determines the relationship between life insurance and economic growth (dynamic panel threshold model) (Lee C.-C. et al., 2013). The article of (Han L. et al., 2010) examines the relationship between insurance de-

velopment and economic growth using GMM models on a set of dynamic panel data for 77 countries for the period of 1994–2005.

There are other studies offering models for evaluating the work of insurance industry enterprises, but they evaluate their activities from the point of view of the integration of national insurance markets without connection with the socio-economic development of the regions.

2. Methodology and discussion

The model for assessing a socio-economic development of regions and their insurance markets implies their ranking by certain indicators or a complex of them, and therefore, it is actually a rating model based on the calculation of indices. The essence of the model is a comparative assessment of factors related to regional insurance markets, based on the methodology applied by the UN to assess countries using the integral indicator of “Human Development Index (HDI)”¹.

Considering each of the listed indicators, three partial indices have been calculated respectively (formula 1):

$$I = \frac{D_{\text{fact}} - D_{\text{min}}}{D_{\text{min}_{\text{max}}}} \quad (1)$$

D_{fact} – the actual value of the indicator; D_{min} – the value of the indicator taken as the minimum; D_{max} – the value of the indicator taken as the maximum.

The authors have proposed an index evaluation model similar in algorithm to the UN methodology, but with an expanded list of indicators reflecting the socio-economic development of regions and the insurance markets.

Fig. 1 shows an algorithm that includes the following stages of index calculation within the framework of the proposed model (Fig. 1).

The indicators of socio-economic development shown in the diagram are calculated per capita and selected because, according to the authors, they are the most important (key) in assessing the development of the region, informative and can be obtained for any region.

These indicators reflect both the level and quality of life of the population in the region (social potential) and the level of development of the regional economy as a whole (economic potential).

Further, on the basis of the listed seven indicators, partial indices of I_1 – I_7 have been calculated in reliance on the statistical data considering the formulas similar to the formula 1: I_1 – GRP index per capita (formula 2):

$$I_1 = \frac{GRP_{\text{fact}} - GRP_{\text{min}}}{GRP_{\text{min}_{\text{max}}}} \quad (2)$$

I_2 – life expectancy index (formula 3):

$$I_2 = \frac{LEX_{\text{fact}} - LEX_{\text{min}}}{LEX_{\text{min}_{\text{max}}}} \quad (3)$$

The remaining private indices of the socio-economic development of the region have been calculated in the same way:

I_3 – index of income per capita; I_4 – index of investments in fixed assets; I_5 – housing security index; I_6 – employment index; I_7 – the index of qualification of employees.

The calculation data are shown in Table 1.

On the basis of private indices, the authors have determined the integral index of the socio-economic development of the region according to the geometric mean formula (formula 4):

$$I = \sqrt[7]{I_1 \times I_2 \times I_3 \times I_4 \times I_5 \times I_6 \times I_7} \quad (4)$$

Further, the key indicators of the development of regional insurance markets have been identified in order to compare them further with the level of socio-economic development of the regions of Russia. The initial data for calculations (indicators of insurance premiums, payments, etc.) are taken from the website of the Bank of Russia.

Making use of these indicators, the authors have calculated the private insurance market indices of (J_1 – J_4), having applied formulas similar to the formulas 2 and 3:

- insurance premium index per capita;
- index of the number of contracts per capita;
- insurance premium index in GRP;
- index of the level of insurance payments.

The calculation data are shown in Table 2.

¹ Human Development Index. [electronic resource]. https://ru.wikipedia.org/wiki/Индекс_человеческого_развития#Метод_используемый_для_вычисления_ИЧР

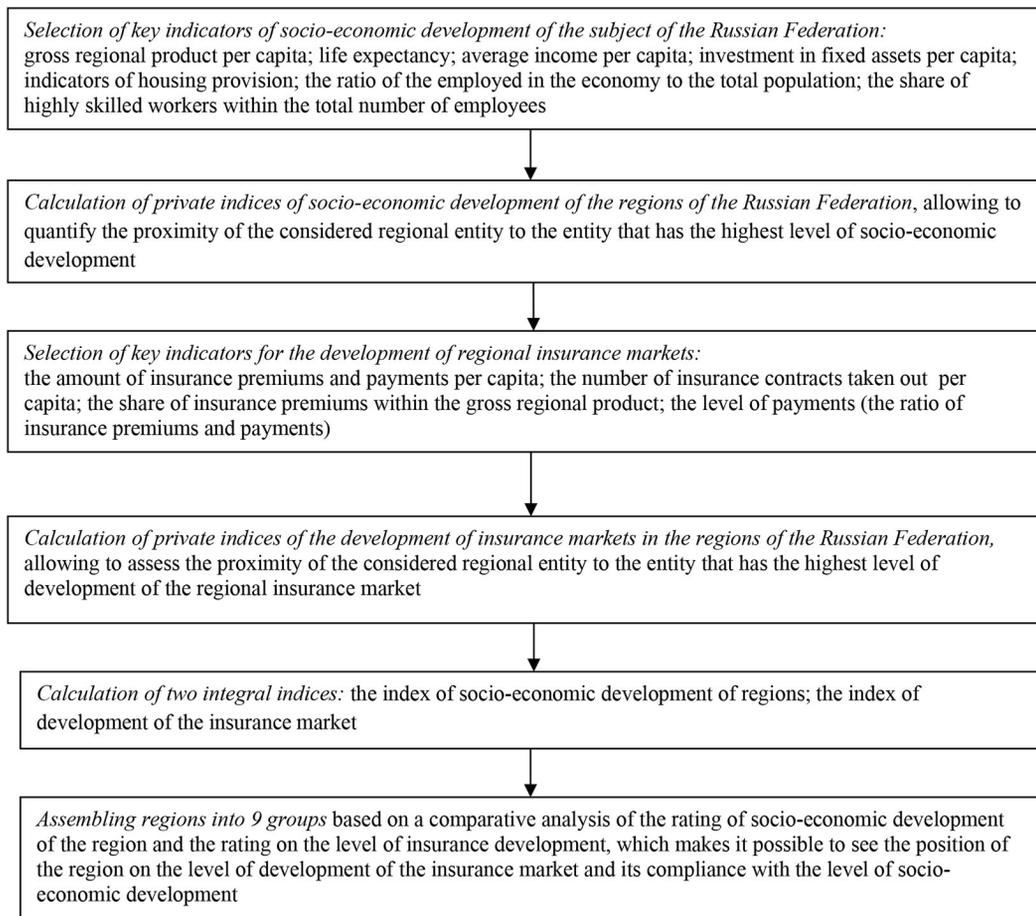


Fig. 1. Algorithm for assessing the socio-economic development of regions and their insurance markets

Source: Compiled by the authors

Table 1. Private indices of socio-economic development of Russian regions in 2020

Regions of Russia	I_1	I_2	I_3	I_4	I_5	I_6	I_7
The Russian Federation total	0,222	0,364	0,279	0,177	0,627	0,398	0,356
Central Federal District	0,306	0,440	0,454	0,200	0,689	0,495	0,582
Belgorod Region	0,209	0,419	0,236	0,133	0,927	0,452	0,238
Bryansk Region	0,083	0,299	0,176	0,029	0,845	0,298	0,034
Vladimir Region	0,110	0,272	0,131	0,053	0,819	0,401	0,123
Voronezh Region	0,127	0,383	0,231	0,170	0,860	0,328	0,226
Ivanovo Region	0,046	0,270	0,138	0,000	0,679	0,355	0,092
KalugaRegion	0,176	0,302	0,222	0,132	0,870	0,441	0,176
KostromaRegion	0,077	0,302	0,130	0,006	0,736	0,281	0,230
KurskRegion	0,135	0,297	0,188	0,176	0,870	0,361	0,337
Lipetsk Region	0,157	0,364	0,238	0,185	0,933	0,405	0,280
Moscow Oblast	0,233	0,397	0,458	0,187	1,000	0,592	0,674

Continuation of Table 1

Regions of Russia	I_1	I_2	I_3	I_4	I_5	I_6	I_7
Oryol Region	0,095	0,315	0,142	0,072	0,793	0,151	0,218
RyazanRegion	0,109	0,356	0,154	0,046	0,959	0,214	0,111
SmolenskRegion	0,100	0,273	0,162	0,068	0,788	0,301	0,192
TambovRegion	0,091	0,378	0,173	0,154	0,870	0,221	0,280
TverRegion	0,105	0,232	0,159	0,057	0,964	0,421	0,061
TulaRegion	0,141	0,293	0,179	0,156	0,793	0,405	0,383
YaroslavlRegion	0,150	0,338	0,181	0,064	0,741	0,351	0,096
Moscow	0,625	0,682	0,860	0,355	0,269	0,659	1,000
North-Western Federal District	0,269	0,389	0,319	0,200	0,720	0,472	0,398
RepublicofKarelia	0,169	0,246	0,214	0,076	0,679	0,251	0,165
KomiRepublic	0,323	0,236	0,281	0,191	0,746	0,375	0,092
ArkhangelskRegion	0,282	0,301	0,286	0,243	0,736	0,258	0,226
VologdaRegion	0,175	0,268	0,176	0,248	0,876	0,294	0,103
KaliningradRegion	0,164	0,378	0,184	0,122	0,762	0,485	0,218
Leningrad Region	0,227	0,383	0,235	0,354	0,803	0,418	0,284
MurmanskRegion	0,303	0,264	0,414	0,363	0,585	0,559	0,379
Novgorod Region	0,138	0,186	0,141	0,070	0,953	0,341	0,069
PskovRegion	0,075	0,195	0,134	0,029	0,907	0,281	0,042
Saint-Petersburg	0,357	0,552	0,458	0,170	0,622	0,632	0,659
SouthernFederalDistrict	0,113	0,389	0,199	0,080	0,580	0,301	0,180
Republic of Adygea	0,063	0,397	0,188	0,103	0,658	0,077	0,253
Republic of Kalmykia	0,080	0,459	0,029	0,040	0,570	0,258	0,375
Republic of Crimea	0,044	0,325	0,086	0,126	0,244	0,241	0,241
Krasnodarskiy Kray	0,137	0,401	0,286	0,075	0,674	0,348	0,042
Astrakhan Region	0,200	0,397	0,126	0,107	0,534	0,321	0,322
Volgograd Region	0,106	0,411	0,113	0,079	0,560	0,274	0,257
Rostov Region	0,108	0,387	0,212	0,056	0,601	0,294	0,203
Sevastopol	0,071	0,377	0,204	0,110	0,756	0,361	0,552
North Caucasus Federal District	0,038	0,573	0,117	0,045	0,394	0,227	0,253
Republic of Dagestan	0,038	0,728	0,162	0,065	0,285	0,151	0,226
RepublicofIngushetia	0,000	1,000	0,0005	0,018	0,067	0,207	0,180
Kabardino-Balkarian Republic	0,023	0,562	0,073	0,024	0,342	0,348	0,222
Karachay-Cherkess Republic	0,023	0,546	0,034	0,020	0,383	0,013	0,287
Republic of North Ossetia-Alania	0,045	0,517	0,118	0,017	0,777	0,037	0,548
ChechenRepublic	0,008	0,525	0,113	0,035	0,306	0,298	0,241
StavropolTerritory	0,066	0,448	0,117	0,050	0,544	0,324	0,234
Volga Federal District	0,148	0,339	0,175	0,102	0,679	0,355	0,249
Republic of Bashkortostan	0,134	0,320	0,209	0,079	0,642	0,261	0,215
Republic of Mari-El	0,068	0,337	0,064	0,002	0,699	0,331	0,169
Republic o fMordovia	0,083	0,403	0,047	0,053	0,741	0,445	0,272
Republic of Tatarstan	0,253	0,471	0,286	0,239	0,679	0,482	0,387
Udmurt Republic	0,148	0,330	0,127	0,055	0,461	0,418	0,004
Chuvash Republic	0,059	0,371	0,054	0,027	0,720	0,338	0,207
PermRegion	0,190	0,237	0,210	0,139	0,539	0,244	0,061

Continuation of Table 1

Regions of Russia	I_1	I_2	I_3	I_4	I_5	I_6	I_7
KirovRegion	0,065	0,340	0,105	0,034	0,679	0,318	0,241
Nizhny Novgorod Region	0,160	0,300	0,258	0,101	0,705	0,482	0,291
Orenburg Region	0,186	0,282	0,118	0,132	0,663	0,268	0,215
PenzaRegion	0,087	0,382	0,096	0,059	0,845	0,268	0,272
SamaraRegion	0,171	0,328	0,192	0,099	0,684	0,438	0,444
SaratovRegion	0,083	0,347	0,092	0,059	0,813	0,268	0,165
UlyanovskRegion	0,086	0,340	0,107	0,039	0,772	0,281	0,180
UralFederalDistrict	0,410	0,313	0,303	0,373	0,606	0,441	0,310
KurganRegion	0,060	0,226	0,071	0,020	0,617	0,043	0,061
SverdlovskRegion	0,195	0,268	0,337	0,126	0,642	0,341	0,261
TyumenRegion	0,993	0,409	0,475	1,000	0,518	0,602	0,444
ChelyabinskRegion	0,133	0,285	0,132	0,091	0,658	0,498	0,257
Siberian Federal District	0,173	0,224	0,159	0,125	0,565	0,334	0,192
RepublicofAltai	0,055	0,172	0,055	0,114	0,373	0,184	0,184
RepublicofTyva	0,043	0,000	0,000	0,030	0,000	0,000	0,444
RepublicofKhakassia	0,148	0,220	0,091	0,051	0,585	0,227	0,077
AltaiTerritory	0,056	0,255	0,110	0,022	0,544	0,274	0,042
KrasnoyarskTerritory	0,351	0,227	0,227	0,209	0,580	0,435	0,272
IrkutskRegion	0,222	0,125	0,146	0,212	0,570	0,321	0,153
KemerovoRegion	0,120	0,140	0,124	0,139	0,580	0,271	0,084
NovosibirskRegion	0,159	0,296	0,209	0,096	0,601	0,368	0,372
OmskRegion	0,112	0,300	0,155	0,096	0,580	0,401	0,184
TomskRegion	0,191	0,334	0,177	0,097	0,554	0,348	0,188
Far Eastern Federal District	0,259	0,167	0,320	0,292	0,492	0,418	0,264
RepublicofBuryatia	0,064	0,202	0,130	0,065	0,394	0,154	0,268
RepublicofSakha (Yakutia)	0,087	0,343	0,432	0,671	0,466	0,528	0,000
Trans – Baikal Territory	0,494	0,083	0,137	0,082	0,378	0,308	0,487
Kamchatka Region	0,331	0,190	0,540	0,213	0,606	0,666	0,487
Primorsky Krai	0,184	0,188	0,304	0,107	0,482	0,401	0,195
KhabarovskTerritory	0,205	0,157	0,372	0,160	0,513	0,482	0,429
Amur Region	0,166	0,069	0,250	0,740	0,591	0,415	0,088
Magadan Region	0,609	0,132	0,730	0,409	0,777	0,722	0,544
Sakhalin Region	1,000	0,171	0,635	0,824	0,668	0,592	0,222
Jewish Autonomous Region	0,093	0,032	0,150	0,112	0,497	0,284	0,034
Chukotka Autonomous Okrug	0,777	0,033	1,000	0,908	0,492	1,000	0,410

Calculated according to Federal State Statistics Service. [electronic resource]. URL: <https://rosstat.gov.ru>.

Table 2. Private indices of development of insurance markets of Russian regions in 2020

Regions of Russia	J_1	J_2	J_3	J_4
The Russian Federation total	0,182	0,178	0,433	0,213
Central Federal District	0,389	0,392	0,721	0,165
BelgorodRegion	0,076	0,096	0,183	0,255
BryanskRegion	0,064	0,102	0,304	0,250

Continuation of Table 2

Regions of Russia	J_1	J_2	J_3	J_4
VladimirRegion	0,087	0,102	0,344	0,130
VoronezhRegion	0,097	0,099	0,349	0,214
IvanovoRegion	0,077	0,075	0,494	0,130
KalugaRegion	0,090	0,110	0,253	0,272
KostromaRegion	0,065	0,117	0,324	0,280
KurskRegion	0,066	0,085	0,224	0,165
LipetskRegion	0,084	0,080	0,256	0,156
MoscowOblast	0,145	0,118	0,331	0,000
OryolRegion	0,061	0,091	0,264	0,218
RyazanRegion	0,086	0,120	0,342	0,238
SmolenskRegion	0,089	0,119	0,374	0,288
TambovRegion	0,055	0,078	0,246	0,211
TverRegion	0,074	0,120	0,300	0,273
TulaRegion	0,094	0,082	0,312	0,245
YaroslavlRegion	0,097	0,095	0,308	0,260
Moscow	1,000	1,000	0,999	0,173
North-Western Federal District	0,221	0,148	0,450	0,299
Republic of Karelia	0,090	0,108	0,261	0,292
Komi Republic	0,113	0,104	0,188	0,197
Arkhangelsk Region	0,112	0,449	0,211	0,218
VologdaRegion	0,116	0,114	0,329	0,150
KaliningradRegion	0,104	0,084	0,312	0,249
LeningradRegion	0,058	0,052	0,127	0,140
MurmanskRegion	0,147	0,082	0,265	0,167
NovgorodRegion	0,082	0,098	0,276	0,114
PskovRegion	0,063	0,108	0,319	0,267
Saint-Petersburg	0,420	0,169	0,683	0,339
Southern Federal District	0,067	0,081	0,261	0,335
Republic of Adygea	0,029	0,034	0,165	0,502
Republic of Kalmykia	0,025	0,033	0,121	0,376
Republic of Crimea	0,021	0,066	0,144	0,204
KrasnodarskiyKray	0,083	0,084	0,284	0,377
AstrakhanRegion	0,090	0,090	0,227	0,212
VolgogradRegion	0,072	0,077	0,292	0,297
RostovRegion	0,071	0,100	0,286	0,335
Sevastopol	0,006	0,014	0,032	0,626
North Caucasus Federal District	0,026	0,027	0,192	0,621
RepublicofDagestan	0,007	0,011	0,057	1,524
RepublicofIngushetia	0,000	0,001	0,034	2,964
Kabardino-BalkarianRepublic	0,019	0,027	0,170	0,472
Karachay-CherkessRepublic	0,018	0,018	0,162	0,946
Republic of North Ossetia-Alania	0,016	0,024	0,112	1,288
ChechenRepublic	0,004	0,005	0,062	0,810
StavropolTerritory	0,072	0,063	0,387	0,374

Continuation of Table 2

Regions of Russia	J_1	J_2	J_3	J_4
Volga Federal District	0,098	0,101	0,314	0,210
RepublicofBashkortostan	0,088	0,075	0,304	0,225
RepublicofMariEl	0,068	0,084	0,361	0,167
RepublicofMordovia	0,061	0,082	0,289	0,279
RepublicofTatarstan	0,136	0,137	0,286	0,188
UdmurtRepublic	0,086	0,101	0,277	0,199
ChuvashRepublic	0,075	0,094	0,428	0,119
PermRegion	0,114	0,086	0,302	0,155
KirovRegion	0,092	0,144	0,501	0,029
NizhnyNovgorodRegion	0,101	0,104	0,306	0,375
OrenburgRegion	0,078	0,081	0,208	0,251
PenzaRegion	0,068	0,096	0,310	0,162
SamaraRegion	0,133	0,121	0,385	0,194
SaratovRegion	0,068	0,086	0,319	0,234
UlyanovskRegion	0,087	0,086	0,401	0,203
UralFederalDistrict	0,147	0,115	0,200	0,192
KurganRegion	0,052	0,086	0,297	0,380
SverdlovskRegion	0,121	0,111	0,316	0,257
TyumenRegion	0,241	0,123	0,139	0,110
ChelyabinskRegion	0,099	0,118	0,345	0,281
Siberian Federal District	0,087	0,109	0,248	0,288
RepublicofAltai	0,020	0,038	0,126	0,394
RepublicofTyva	0,029	0,024	0,201	0,287
RepublicofKhakassia	0,048	0,084	0,150	0,418
AltaiTerritory	0,049	0,067	0,291	0,263
KrasnoyarskTerritory	0,095	0,138	0,143	0,281
IrkutskRegion	0,096	0,102	0,222	0,301
KemerovoRegion	0,088	0,083	0,329	0,165
NovosibirskRegion	0,125	0,179	0,383	0,387
OmskRegion	0,079	0,094	0,308	0,323
TomskRegion	0,100	0,102	0,264	0,166
Far Eastern Federal District	0,092	0,098	0,185	0,366
RepublicofBuryatia	0,052	0,048	0,287	0,242
RepublicofSakha (Yakutia)	0,085	0,129	0,088	0,018
Trans – Baikal Territory	0,043	0,063	0,195	0,364
Kamchatka Region	0,106	0,066	0,172	0,332
Primorsky Krai	0,108	0,097	0,293	0,629
KhabarovskTerritory	0,128	0,139	0,321	0,446
Amur Region	0,098	0,112	0,288	0,066
Magadan Region	0,147	0,143	0,132	0,056
Sakhalin Region	0,126	0,101	0,061	0,299
Jewish Autonomous Region	0,034	0,060	0,150	0,941
Chukotka Autonomous Okrug	0,025	0,021	0,000	0,276

Calculated according to Official website of the Bank of Russia. [electronic resource]. URL: cbr.ru/statistics/insurance/

Further, the integral index of the insurance market development has been calculated (formula 5):

$$J = \sqrt[4]{J_1 \times J_2 \times J_3 \times J_4} \quad (5)$$

Having calculated the two integral indices, the authors have provided a comparative analysis of the integral indices upon the regions of Russia (Federal Districts and Subjects of the Russian Federation). All regions have been rated according to the values of the integral indices. The ranking data are shown in Table 3.

Further, a rating correlation of the socio-economic development of the region and of the insurance development of this very region has been carried out.

The authors have proposed to sort out the rating values of the insurance markets of the regions into three groups:

- Group 1 – high level – rating 1–27;
- Group 2 – average level – rating 28–54;
- Group 3 – low level – rating 55–80.

Further, the authors propose to divide each of the three groups into three more groups, depending on the degree to which the development of the insurance market corresponds to the level of socio-economic development:

- 1) the level of development of the insurance market corresponds to the level of socio-economic development of the region. It is assumed that the deviations of the two ratings are no more than 10 points;
- 2) the level of development of the insurance market is higher than the level of development of the socio-economic development of the region by more than 10 rating points;

- 3) the level of development of the insurance market is lower than the level of socio-economic development of the region by more than 10 rating points.

If the ratings of the development of the socio-economic sphere of the region or the insurance market have relatively low values, then, despite their compliance, we could also talk about the weak development of the insurance market, as well as the socio-economic sphere itself. Table 4 gives the generalized statistics of the distribution of the regions by Federal Districts.

Analyzing the position of regions in Table 4, it could be seen that the highest level of development of insurance markets is observed among the subjects of the Central and Volga Federal Districts. The lowest indicators of the insurance market development and its efficiency are observed in most regions of the North Caucasus and Far Eastern Federal Districts.

The general conclusion is that, despite the differentiated conditions of the socio-economic development of the regions of Russia, the level of development of insurance markets in most regions is equally low. Most of the ratings of insurance markets of the regions are significantly lower than the ratings of these regions in terms of the socio-economic development.

3. Conclusion and recommendations

The evaluation of the model provides the authors with an opportunity to draw the following summary:

1. The proposed model gives a quantitative description of the insurance market of

Table 3. Ratings of Russian regions by integral indices of socio-economic development and insurance market development

Regions of Russia	Indicators of socio-economic development		Indicators of insurance development	
	Integral index <i>I</i>	Rating of the region	Integral index <i>J</i>	Rating of the region
1	2	3	4	5
The Russian Federation total	0,3216	-	0,2339	-
Central Federal District	0,4231	1	0,3670	1
Belgorod Region	0,3097	13	0,1359	51
Bryansk Region	0,1410	68	0,1493	34
Vladimir Region	0,1885	49	0,1413	46

Continuation of Table 3

1	2	3	4	5
Voronezh Region	0,2758	23	0,1633	20
Ivanovo Region	0,1833	53	0,1389	48
Kaluga Region	0,2701	25	0,1616	23
Kostroma Region	0,1366	69	0,1624	21
Kursk Region	0,2815	20	0,1199	63
Lipetsk Region	0,3084	14	0,1278	56
MoscowOblast	0,4393	7	0,1782	12
Oryol Region	0,1869	50	0,1336	54
Ryazan Region	0,1806	54	0,1699	14
Smolensk Region	0,2017	45	0,1837	9
Tambov Region	0,2423	31	0,1220	61
Tver Region	0,1774	58	0,1642	19
Tula Region	0,2820	19	0,1558	29
Yaroslavl Region	0,2036	44	0,1646	18
Moscow	0,5838	2	0,6444	1
North-Western Federal District	0,3675	3	0,2576	2
RepublicofKarelia	0,2115	41	0,1653	16
KomiRepublic	0,2700	26	0,1443	42
Arkhangelsk Region	0,3062	16	0,2193	5
Vologda Region	0,2462	30	0,1596	27
Kaliningrad Region	0,2728	24	0,1614	24
Leningrad Region	0,3535	12	0,0855	70
Murmansk Region	0,3946	8	0,1519	31
Novgorod Region	0,1780	56	0,1262	57
Pskov Region	0,1294	72	0,1553	30
SaintPetersburg	0,4541	6	0,3579	2
Southern Federal District	0,2160	7	0,1478	7
RepublicofAdygea	0,1803	55	0,0949	68
RepublicofKalmykia	0,1568	63	0,0784	76
Republic of Crimea	0,1554	64	0,0800	73
KrasnodarskiyKray	0,1972	46	0,1655	15
Astrakhan Region	0,2488	29	0,1406	47
Volgograd Region	0,2053	43	0,1483	35
Rostov Region	0,2095	42	0,1618	22
Sevastopol	0,2648	27	0,0355	80
North Caucasus Federal District	0,1593	8	0,0959	8
RepublicofDagestan	0,1614	62	0,0496	79
RepublicofIngushetia	0,0526	82	0,0034	82
Kabardino-BalkarianRepublic	0,1293	73	0,0801	72
Karachay-CherkessRepublic	0,0742	82	0,0841	71
Republic of North Ossetia-Alania	0,1333	70	0,0864	69
ChechenRepublic	0,1210	74	0,0303	81
StavropolTerritory	0,1839	52	0,1599	25
Volga Federal District	0,2454	5	0,1597	4
RepublicofBashkortostan	0,2206	38	0,1460	38

Continuation of Table 3

1	2	3	4	5
RepublicofMariEl	0,1046	78	0,1361	50
RepublicofMordovia	0,1851	51	0,1414	44
RepublicofTatarstan	0,3744	10	0,1781	13
UdmurtRepublic	0,1140	75	0,1480	36
ChuvashRepublic	0,1482	66	0,1375	49
Perm Region	0,1947	48	0,1464	37
Kirov Region	0,1702	60	0,1181	64
NizhnyNovgorod Region	0,2762	22	0,1862	8
Orenburg Region	0,2272	36	0,1346	52
Penza Region	0,1968	47	0,1342	53
Samara Region	0,2821	18	0,1863	7
Saratov Region	0,1779	57	0,1445	41
Ulyanovsk Region	0,1734	59	0,1571	28
Ural Federal District	0,3829	2	0,1595	5
Kurgan Region	0,0846	79	0,1500	33
Sverdlovsk Region	0,2774	21	0,1815	11
Tyumen Region	0,5961	1	0,1459	39
Chelyabinsk Region	0,2340	35	0,1835	10
Siberian Federal District	0,2236	6	0,1616	3
RepublicofAltai	0,1331	71	0,0785	75
RepublicofTyva	0,0829	80	0,0799	74
RepublicofKhakassia	0,1477	67	0,1261	58
AltaiTerritory	0,1117	77	0,1261	59
KrasnoyarskTerritory	0,3074	15	0,1512	32
Irkutsk Region	0,2187	39	0,1598	26
Kemerovo Region	0,1685	61	0,1414	45
Novosibirsk Region	0,2586	28	0,2396	3
Omsk Region	0,2156	40	0,1648	17
Tomsk Region	0,2350	34	0,1454	40
Far Eastern Federal District	0,3004	4	0,1570	6
RepublicofBuryatia	0,1508	65	0,1145	66
RepublicofSakha (Yakutia)	0,3591	11	0,0642	77
Trans – BaikalTerritory	0,2215	37	0,1176	65
Kamchatka Region	0,3916	9	0,1416	43
PrimorskyKrai	0,2373	33	0,2094	6
Khabarovsk Territory	0,2968	17	0,2248	4
Amur Region	0,2400	32	0,1203	62
Magadan Region	0,4955	4	0,1117	67
Sakhalin Region	0,5006	3	0,1236	60
Jewish Autonomous Region	0,1137	76	0,1308	55
Chukotka Autonomous Okrug	0,4647	5	0,0528	78

Calculated according to Federal State Statistics Service. [electronic resource].URL: <https://rosstat.gov.ru>; Официальный сайт Банка России. [Электронный ресурс]. URL: cbr.ru/statistics/insurance/

Table 4. Cross reference between the development of insurance markets and socio-economic development by Federal Districts

Federal Districts (FD)	The number of regions where the level of development of the Insurance market is higher than the level of socio-economic development of the region	The number of regions where the level of development of the Insurance market corresponds to the development of the socio-economic sphere	The number of regions where the level of development of the Insurance market is below the level of socio-economic development	Totals (corresponding to the total number of regions in the district)
Central FD	6	8	4	18
Northwest FD	3	4	3	10
South FD	2	2	4	8
North Caucasian FD	2	4	1	7
Privolzhsky FD	8	5	1	14
Uralsky FD	2	1	1	4
Siberian FD	5	4	1	10
Far Eastern FD	3	1	7	11
the Russian Federation total	31	29	22	82

Source: Compiled by the authors.

the region in a two-dimensional comparison. Based on the definition of ratings of insurance markets and ratings of socio-economic development of regions, it is possible to compare: a) regions with each other according to the level of development of insurance markets; b) the level of development of the insurance market of a particular region with the level of its socio-economic development.

2. The advantage of this model is the use of formalized and objective criteria (indicators) for assessing regions and insurance markets. Therefore, the model is universal and could be applied to any country with a transitive economy.

3. The proposed model is open to supplement the list of indicators. Depending on the specifics and conditions of development of a particular country, the list of indicators used both to assess the rating of the region and to assess the rating of the insurance market might vary.

4. Other countries with transitive economies also have problems of uneven development of insurance markets. Therefore, this model could be applied to any country with an administrative-territorial division, and allows to analyze the degree of this disparity.

5. Ensuring that the level of development of insurance markets corresponds to the general level of economic development is a global

problem that hinders the active functioning of the global insurance market and the inefficient distribution of insurance capital. The proposed model makes it possible to assess the regional insurance market, to identify problem regions, and, based on the results obtained, to develop a regional insurance policy aimed at solving the identified problems.

Due to the results obtained, the following recommendations could be made to increase the economic potential of regional insurance markets in order to reduce discrepancies between the level of development of the economy and insurance markets.

1. To develop the level of insurance culture of the population, thereby forming the demand for voluntary insurance services.

2. To encourage the introduction of state and regional insurance support programs, for example, in agricultural insurance, housing insurance, environmental risk insurance and other types of insurance that are significant on a regional and global scale.

3. To increase the transparency of pricing in insurance activities and to limit the share of remuneration to intermediaries through legislative or regulatory measures. This recommendation could stimulate demand for insurance services. Currently, this is hindered by the

inflated cost of insurance services, which is observed in many countries with economies in transition.

4. To improve the professionalism of specialists in the field of insurance by developing insurance education and scientific potential in countries and regions.

5. Stimulate competition in insurance markets and improve the quality of insurance services, especially at the stage of loss settlement. The growth of competition will help accelerate the integration of countries with a transition economy into the global insurance community.

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